TOOL DIE MACHINE

PROGRESS

The National Tool and Die Journal

Adding To The Efficiency Of Modern Machines

Speed IN CUTTING... Smoothness IN FINISH

You get the real "low-down" on the quality of end mills, when you put them to the test of high speeds.

The work illustrated is the milling of a master cam on a Milwaukee Rotary Head Tool and Die Milling Machine. The speed of this operation produces an exceptional finish with the milling operation alone. It is definitely significant that on work such as this, Putnam Hi-Speed End Mills are used regularly—not only for their ability to stand up at high speeds but for their accurate, smooth cutting action.

If you want more speed and longer tool life, specify Putnam End Mills for all of your milling machines. Your own experience will bear out the many actual production tests which have proved that speeds and feeds for Putnam End Mills can be increased approximately 30% over those of ordinary mills.

JUNE 1940

Circulation more than 12,500

PUTNAM *Hi-Speed* END MILLS

PUTNAM TOOL CO. • 2985 Charlevoix Ave. • Detroit

WHAT THE PRODUCTION & MACHINE TOOL SHOW MEANS TO YOU

INCREASED PROFITS

Modern machines will be demonstrated by practical engineers—solving your production problems.

Seeing machines in actual operation will tell you more in a few minutes than hours of your time spent studying literature and listening to extensive explanations.

ATTEND THE SHOW

For information write
THE PRODUCTION AND
MACHINE TOOL SHOW
Grafton • Wisconsin

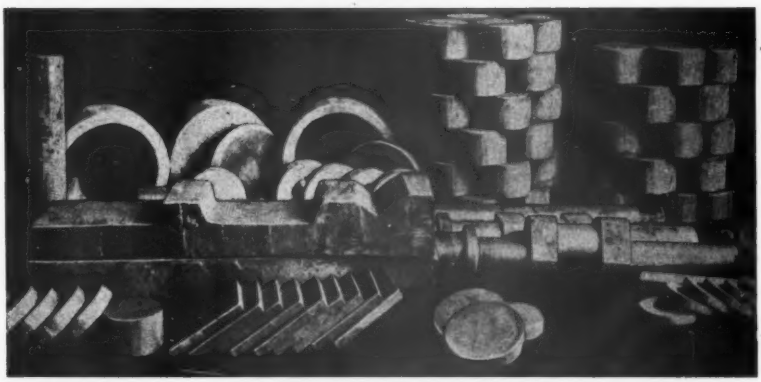
CLEVELAND PUBLIC AUDITORIUM

JUNE 25 · 26 · 27 · 28 · 29 · 1940

FCC

Copyright 1938 by The Forging and Casting Corporation.

PRODUCTS AND SERVICES



Forgings · Composite Die Sections · Nitri-cast-iron
Tool Steel Cast to Shape · Metal Resistance Grids
Special Alloy Steels · FCC Air Hardening Welding
Rod · Rough Machining and Heat Treating

THE FORGING AND CASTING CORPORATION
FERNDALE (DETROIT), MICHIGAN

When you order or write about products described in TDM PROGRESS please mention the publication.

Copyright 1940 by George J. Huebner

TOOL·DIE·MACHINE PROGRESS
The National Tool and Die Journal

Editor
George J. Huebner
Assistant Editor
Paul L. Reed

Official Organ of the Special Tool, Die and Machine Shop Institute

Vol. 6 **JUNE, 1940** **No. 3**

CONTENTS

Production and Machine Tool Show in Cleveland 15
The Design of a Cooling Fixture for a Molded Casting 18
Glossary of Plastic Mold Designing 20
Designing and Estimating a Double Progressive Emboss, Pierce and Blank Die—by Charles Bohmer and George Dannes 23
The Place of Portable Power Tools in the Tool Room and Die Shop 28
Sommer and Adams Announces New Cleveland Vertical Milling Machine .. 30
Contract Shops 58
Advertisers' Index 66

SIMPLIFIES
Die Construction
•
Anchoring Machine Parts
•
Chuck Jaws
•
Many Other Applications

SIMPLIFIES
Bending of Metal Tubes and Mouldings
•
Templates for Spotting Forming Dies
•
Engraving Machine Models
•
Many Other Applications

SIMPLIFIES
Master Patterns
•
Proof Casting Molds
•
Electroforming
•
Many Other Applications

For complete information send for literature or contact nearest representative or distributor.

BROOKLYN, N. Y. Belmont Smelting & Refining Co.
PHILADELPHIA, PA. Machine & Tool Designing Co.
CLEVELAND, OHIO . . . Die Supply Company
DETROIT, MICH. Curtis Ind'l Designing Engineers
CHICAGO, ILL. . . . Sterling Products Co., Inc.
MILWAUKEE, WIS. . . . . Harry C. Kettelson
SAN FRANCISCO, CALIF. Jamison Steel Corporation
LOS ANGELES, CALIF. Jamison Steel Corporation
MONTREAL, CANADA . Dominion Merchants Ltd.
LONDON, ENG. . Mining & Chemical Products Ltd.

CERRO DE PASCO COPPER CORPORATION
40 WALL STREET NEW YORK, N. Y.

Tool·Die·Machine PROGRESS
2460 Fairmount Boulevard, Cleveland, Ohio
GEORGE J. HUEBNER, *Publisher*,
Telephone YEllowstone 4040
Advertising Representatives Macfarland & Heaton, 289 Fourth Avenue, New York, N. Y.
Telephone GRamercy 5-2380

When you order or write about products described in TDM PROGRESS please mention the publication.

Grinding and Fitting Contours in Difficult Die Making

Old Method
HOURS in TIME
$ $ $ $ in COST

Old Methods always worked because only mechanics who were expert at fitting dies and punches were permitted to do such difficult and exacting tasks. Long, tedious hours were consumed in filing and hand-stoning odd shaped contours to proper fit. That is why costs were always so high.

New Method—
MINUTES in TIME
¢ ¢ ¢ ¢ in COST

BOYAR-SCHULTZ Profile Grinders point the way to the New Method of fitting dies and punches as well as templates, cams and other uneven surfaces and difficult contours. These and other similar tasks can be completed in minutes instead of hours. And the resulting savings are not the only advantage . . . . a better job done can always be expected.

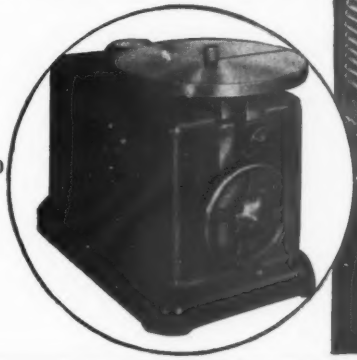
Hundreds of Tool and Die Shops and Toolrooms throughout the country and abroad have discovered the excellent work and savings possibilities in BOYAR-SCHULTZ Profile Grinders.

Available in Portable Bench Model and in the Large Floor Model for larger and heavier work.

Write For Detailed Information

BOYAR-SCHULTZ CORPORATION

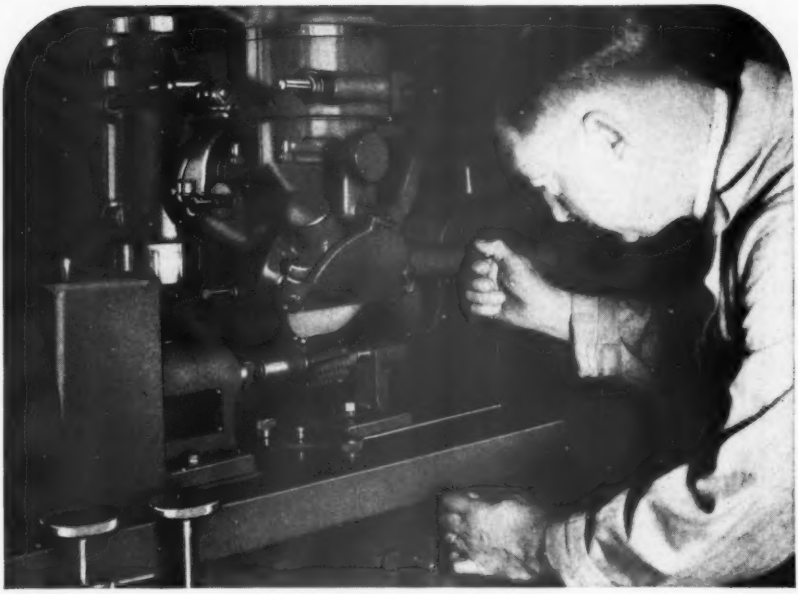
2112 Walnut Street Chicago, Ill.



We Also Make COPPERHEAD LAPS and SMB Bolts

When you order or write about products described in TDM PROGRESS please mention the publication.

PRECISION
Your Constant Guarantee of Accuracy
DANLY MACHINE SPECIALTIES, Inc.
2121 So. 52nd Avenue, Chicago, Ill.
Danly Die Sets and Die Makers' Supplies from the 9 Danly Branch Stocks
LONG ISLAND CITY, N. Y. 36-12 34th STREET
PHILADELPHIA, PA. 3913 N. BROAD STREET
DETROIT, MICHIGAN 1549 TEMPLE AVENUE
ROCHESTER, N. Y. 16 COMMERCIAL ST.
CLEVELAND, OHIO 1745 ROCKWELL AVENUE
MILWAUKEE, WIS. 513 EAST BUFFALO ST.
DAYTON, OHIO 990 E. MONUMENT AVE.
DUCOMMUN Metals and Supply Co. Los Angeles—San Francisco
23,000,000 stampings have been made in this die mounted in a Danly Precision Die Set
DANLY PRECISION DIE SETS
DANLY DIE SETS and DIE MAKERS' SUPPLIES



WE'VE MADE A HOBBY out of Hob Grinding

● Developing the right wheels for grinding hobs (or for any other grinding job) has been our hobby for years. Constant research in laboratory and field, and improved manufacturing methods have enabled us to produce wheels that are exactly suited to each tool room job. That's why tool grinding wheels by Carborundum are so successful.

Operators like them because they cut faster with lighter pressure... with greater ease. It requires less effort to turn out fine finishes and close tolerances—perfect workmanship. Supervisors like them because they always turn out smooth, accurate finishes. Their cool-cutting action does not affect the temper of fine steels. Management likes them because in the last analysis their fast-cutting action... the fine work they produce... the reduced machine maintenance they make possible... add up to lower costs and increased profits.

Remember to specify Aloxite Brand Aluminum Oxide Tool Room Wheels next time you order!

CARBORUNDUM
ABRASIVE PRODUCTS

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

NIAGARA FALLS, N. Y.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company)

When you order or write about products described in TDM PROGRESS please mention the publication.

Another DRIVE-ALL Installation Which Can Be Duplicated On Your Machines

Brackets Carried in Stock for Motorizing all Types of Machines

Price of 3-Speed Gear Box with Brackets

$87.50

4-Speed Gear Box $10.00 Additional

The original cone pulley can be used satisfactorily; this clutch pulley was taken from old countershaft ⟶

DRIVE-ALL MANUFACTURING CO.

3401 Conner Ave., Detroit, Michigan

NEW SOUTH BEND 10-INCH LATHE

1" Collet Capacity
1⅜" Spindle Hole
50 to 1400 R.P.M. Spindle Speeds
Power Cross Feed
Power Long. Feed
Screw Threads 4 to 224 Per Inch

Hand Lever Draw-in Collet Chuck

Hand Wheel Draw-in Collet Chuck

For Precision Tool Room Work and for Production Operations

THIS new 10-inch swing 1-inch collet capacity back-geared, screw cutting precision lathe has the time saving features of an engine lathe combined with the sensitivity and accuracy of a fine precision collet lathe. It is capable of the most exacting tool and instrument work, and has the power and rigidity for taking heavy cuts on high speed manufacturing operations.

Manufacturing attachments available include hand lever draw-in collet chuck, semi-automatic hand lever bed turret, double tool rest, automatic carriage stop, four-way tool post, hand lever tailstock, oil pan, oil pump and piping.

Tool Room attachments include hand wheel draw-in collet chuck, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and collet rack.

SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906 197 E. Madison St., South Bend, Ind., U.S.A.

When you order or write about products described in TDM PROGRESS please mention the publication.

A Battery of Norton 6″ Surface Grinders

In the Die Department of a Plastics Plant

IN die shops and tool rooms these Norton 6 x 18″ Surface Grinders are proving their worth every day. They are available in a variety of arrangements—hydraulic or hand table traverse or both—automatic or hand cross feed or both—ball bearing or plain bearing, belt-driven wheel spindle or an integral motor, ball bearing spindle. They are supplied for wet or dry grinding, with or without a dust exhaust system. They are handy to operate, easy to service and economical to maintain.

Write for descriptive circular—no obligation, you know.

NORTON COMPANY
Worcester, Mass.
New York Chicago Detroit Cleveland
Hartford London

M-420

When you order or write about products described in TDM PROGRESS please mention the publication.

Be Sure To See the
Lester-Phoenix Plastic Molding Machines When You Come to Cleveland This Month!

—and the Lester-Phoenix Die Casting Machines, too, for zinc, aluminum, brass and magnesium. We're just a few minutes from Public Auditorium. We'll be glad to pick you up, whisk you to our plant, and take you back. Don't miss this opportunity to see how Lester engineering and Phoenix craftsmanship have joined hands to give you a series of really remarkable improvements in both injection molding and die casting equipment. Just call CHerry 1048, and say, "Come and get us."

Matching the astonishing progress in the plastic art itself is the progress recorded by Lester-Phoenix in plastic molding press design. And these same startling ideas in design and construction have been applied with equal success to the die casting field.

Both Lester-Phoenix Injection Molding and Die Casting Machines offer you, among other features, the following: rigid cast steel beams replacing tie rods and virtually eliminating flash; a worm-and-work wheel adjustment that makes die-setting a matter of minutes only; and keeps the two die-mounting plates always parallel; a wedge action that affords positive mold-locking and takes all strain off the toggle pins; a heating cylinder with a new degree of accessibility; a reduction of the human element to a negligible quantity; a new high in safety and accuracy; a new low in waste time and lost motion; in short, a new conception of profit-making possibilities.... See all this when you come to Cleveland this month.

LESTER PHOENIX DIE CASTING AND PLASTIC EQUIPMENT

THE PHOENIX MACHINE CO.

2711 Church Avenue • Cleveland, Ohio

When you order or write about products described in TDM PROGRESS please mention the publication.

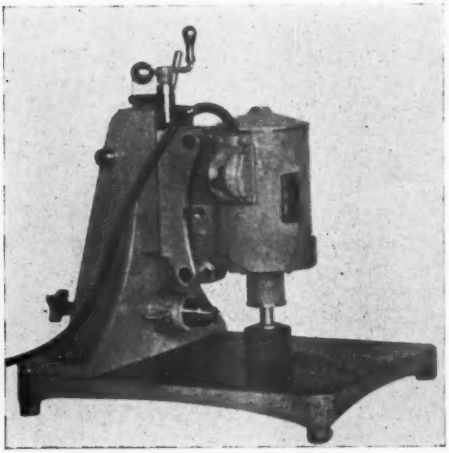
When the Pressure is Really On— the *GRINDRITE* is a Friend indeed

The *Grindrite* and its *Companion Work Bench* are a team that is working for hundreds of shops and departments — performing grinding and filing operations in less than half the time required by tedious hand filing. The *Grindrite* is unsurpassed as a stock remover.

The *Grindrite* is particularly useful for grinding out small dies to the line or template, raised edges on punches and difficult surfaces which heretofore required special set-ups.

SPECIFICATIONS:

Height	Approx. 58 inches
Floor Space	Approx. 29″ x 33″
Weight	Approx. 600 lbs.
Motor:	1 HP—1750 RPM—220 or 440 V.
Grinding Wheels:	8″ dia. 3½″ face.



The *Grindrite Jr.*, a portable bench type grinder, is unusually rugged for its size and weight — it is of particular value in shops which handle a large number of small dies and die parts.

Literature on both the regular Grindrite and Grindrite Jr. will be sent on request. Ask for Catalog and also list of users.

Die Service—Our facilities for designing and building large dies is unexcelled. Our service is complete.

Largest Independent Die Builder

KOESTLIN TOOL & DIE CORP.

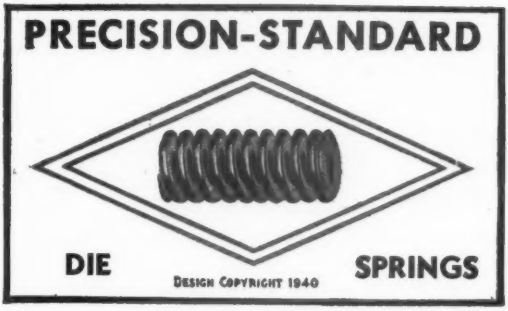
3601 Humboldt Ave. Detroit, Mich.

When you order or write about products described in TDM PROGRESS please mention the publication.

Now Your

PRECISION-STANDARD DIE SPRINGS

are Packed in Cartons with this Label



For many years *Precision-Standard* PS *Die Springs* have been designed and manufactured to meet the most exacting requirements of die, tool, jig and fixture builders.

***Precision-Standard Die Springs* have continuously assured stamping and forging manufacturers and all die users of longer spring fatigue life and trouble-free die operation.**

They have been approved and adopted as standard by leading automotive manufacturers.

All *Precision-Standard Die Springs* are now available in cartons to enable you to select sizes quickly and to maintain stocks complete and orderly.

Standardize on PS Die Springs

Send for complete Catalog

PRECISION SPRING CORPORATION

15400 WOODROW WILSON AVE. DETROIT, MICHIGAN

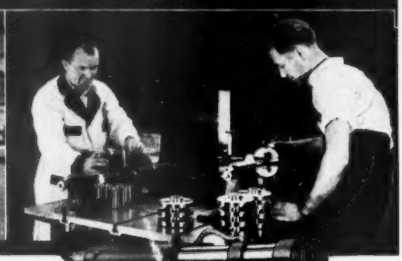
Coiled and Flat Springs for Every Purpose

When you order or write about products described in TDM PROGRESS please mention the publication.

Milwaukee ACCURACY..

IS SAFEGUARDED BY CONSTANT —

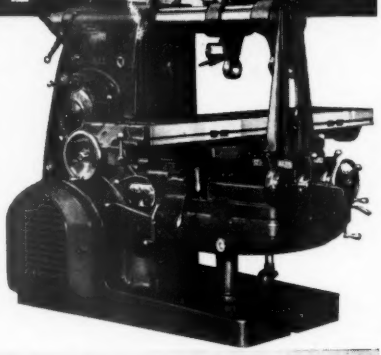
✓ TESTING
✓ CHECKING
✓ INSPECTION



THE performance-accuracy of Milwaukee Milling Machines is assured by contant testing, checking and inspection. A staff of 75 highly trained technical men are engaged in this important task.

In the world's largest plant devoted exclusively to the manufacture of milling machines there can be no variation from high manufacturing standards.

Kearney & Trecker Corporation
Milwaukee, Wisconsin



K&T Milwaukee MILLING MACHINES

When you order or write about products described in TDM PROGRESS please mention the publication.

TOOL · · DIE · · MACHINE
PROGRESS
The National Tool and Die Journal
JUNE, 1940 Vol. 6, No. 3

First Production and Machine Tool Show in Cleveland

THE visitor at The Production and Machine Tool Show, June 25 to 29 at Cleveland's Public Auditorium, will find many interesting and worthwhile groups of the newest equipment; he will be able to observe improved methods in machines; and he will find himself at home among a number of the industry's key men who will be in attendance.

From the start the Show management has made persistent effort to attract exhibitors in such groups that displays of equipment, materials, or services will give the visitor the best opportunity to gain the greatest amount of new technical information and to give him the practical information of greatest value to himself and his company. As the time nears for the start of the Show, it is clear that this objective has been realized. Instead of a great many directly competitive exhibitors, there are an unusual number of companies whose exhibits will supplement each other. This is a definite advantage to the visiting shop or department executive, since it will give him a better over-all picture of the latest progress in the phases of the metal working industries in which he is most interested.

Since the Show will run only five days, exhibitors will be able to send many of their key men, both for duty at their own booths and for the purpose of studying the newest developments—both those by their companies which are their sources of supply and by companies and departments to whom they sell. This compactness of interest will be valuable to the visitor who will be able to spend only one or two days at the Show.

The tremendous production crisis that faces the tool rooms, die and mold shops, just as squarely as it faces the assembly and high production industries, will accentuate the closely-knit interest of exhibitors and visitors alike.

The management of the Show states that practically all exhibitors will have one or more "live" displays. A number of new machines, accessories, tools and processes will be shown.

A number of Cleveland firms and plants have arranged to conduct shop tours for interested visitors. Some of these trips must be limited due to the capacity working conditions of Federal defense work. The management suggests that prospective Show visitors make their special interests known upon registration. Or individual exhibitors or executives in other Cleveland plants may be contacted by mail prior to the Show.

The companies who will exhibit at the Show include the following:

Blank & Buxton
Jackson, Michigan

Cassels Engr. & Machine Co.
Wauwatosa, Wisconsin

Clark Tructractor
Battle Creek, Michigan

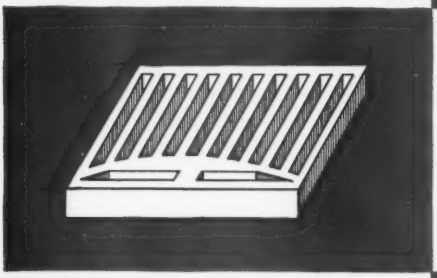
C. C. Craley Co.
Shillington, Pa.

(Continued on Page 41)

Saved $43 Making this Punch

Capitol Products Co. of Winsted, Conn., made this punch for base of electric toaster from 2″ thick Paragon Tool Steel. The DoAll produced it in 2 hours and 20 minutes. Accuracy from outside to bottom, within .003″. They estimate these savings:

17 hours, 40 minutes	$28.00
25 pounds of steel	15.00



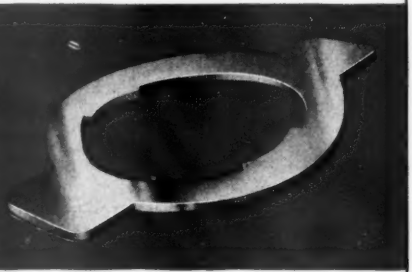
2 Weeks' Work in 9 Hours

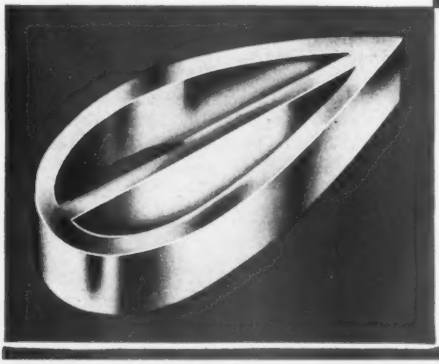
At Standard Tool & Die Co., Moline, Ill., this Grille Die with 14 separate openings was made from 1″ alloy steel on the DoAll in 1 day.

Think of it—over 160 linear inches of sawing and filing—a die which formerly required two weeks to make.

DOALL Saved 22½ Hours

Northwest Airlines, Inc., of St. Paul, Minn., made this special Wrench from chrome molybdenum steel in 80 minutes on the DoAll, 40 minutes for sawing, 40 minutes for filing. Outside dimensions are 24″ long, 18″ wide. Former time was 24 hours burning, milling, shaping and sanding.





A Day's Work in 2 Hours

At Superior Die Casting Co., Cleveland, Ohio, this die made from ¾″ cold rolled steel was sawed and filed on the DoAll in 2 hours. The same job formerly required a whole day's time to drill, mill and file.

CONTINENTAL MACHINES, Inc.

WAKE UP!

TOOL and DIE MAKERS—

You have a big responsibility today. If ever there was need to be prepared, it is now. America needs new tools and better equipment, and needs them mighty fast. Time waits for nothing —remember that!

Check your own equipment and machinery. Just what kind of service can you give and how fast can you deliver your orders?

DoALL IS 5 YEARS AHEAD

in Proven Quality and Value

Everywhere in America and in 30 foreign countries, DoAll is recognized by industrial leaders as the master machine of them all—the fastest machine method of cutting metal—the greatest machine tool value of all time.

Only the DoALL Has SPEEDMASTER Operation

No other speed control equals this exclusive patented mechanism. A simple turn of the hand-wheel delivers instantly the *right* speed for *every operation* on the DoAll. It's an amazing device far ahead of any other method of speed control.

Quality made throughout, the DoAll's performance under every conceivable condition proves it is priced right. There is only one DoAll and you must see it operate to appreciate its true worth.

Let a factory-trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

DO-ALL
Contour Machine
BAND SAWING
BAND FILING
BAND POLISHING

FREE New Hand Book on Contour Machining—158 pages of valuable metal working helps.

TDM-6

☐ Send data on the DoAll.
☐ Send Free Hand Book.

1303 S. Washington Ave.
Minneapolis, Minn.

Name .....

Address .....

PLASTIC MOLD DESIGNING

By GORDON B. THAYER
Plastic Design Engineer
General Industries Company

Article IV of a Series

The cooling fixture described is designed to hold the walls of spools to shape during curing. While not necessary for the spool for which a mold was designed last month, the fixture design is typical for holding small parts with thin or uneven ections.

Attention is called to the Glossary of Plastic Mold Designing, Page 20.
—*The Editor.*

The Design of a Cooling Fixture for a Molded Casting

A COOLING fixture is a formed or shaped block of metal which is used to maintain the proper shape of a molded casting after it is removed from the mold and until it is cool enough to retain its shape without further appreciable distortion. Such a fixture need not fit every portion of the shape of the casting, but it is designed to control critical dimensions. Unimportant parts and corners may be relieved in order to simplify the machining. Cooling fixtures for large castings are sometimes drilled for cooling water, in order to remove the heat rapidly. They may be built up from cold rolled steel plates or cast of iron or aluminum.

The spool shown in the May article, and for which the mold was designed, may be used as a typical example of a plastic part for which a cooling fixture is very useful.

The primary purpose in using a cooling fixture for the spool shown in Fig. 4 is to aid in removing the split cavity halves conveniently and without bending the flanges of the casting. The wall thickness of this particular spool is sufficient to hold the shape without the use of the fixture. With thinner walls, there is a risk of dishing. If the wall is dished inward, the fixture will push it out. If it is dished outward, the operator can pinch it in, around the fixture while the casting is still soft. With this fixture, it is possible to hold the cored hole slightly larger than it would be if the casting were allowed to cool freely. Thus, if the core block in the mold should happen to be somewhat small, it would be possible to use it anyway, and save the cost of a new one.

Another advantage of the use of this cooling fixture is its ability to maintain accuracy of the casting. The part drawing in Fig. 4 does not call for close limits, but it is sometimes necessary to hold the inside of such a spool rather closely,

as in alternating current work where the spool must fit the core tightly to prevent vibration.

The cooling fixture is shown in Fig. 6. sliding the cavity halves away from the flanges without bending them. Two counterbored holes are provided for fastening the fixture to the bench.

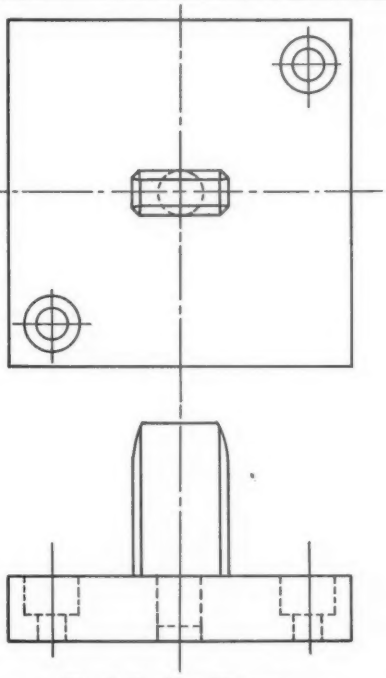


Fig. 6. Cooling Fixture

Plan and elevation of cooling fixture for molded coil spool. The vertical member is longer than height of the spool and tapered for easy entrance into the casting. A pilot turned on the base of the core fits into a drilled hole in the plate. The counterbored holes are used for holding the fixture to the bench.

The vertical member is made longer than the height of the spool, and the extra length is tapered smoothly for easy entrance into the casting, and to avoid scratches and score marks. The four corners are beveled for relief, so that only the sides of the fixture come in contact with the casting. A round pilot is turned on the lower end of the cooling core to fit into a drilled hole in the base plate. The parts are shown welded together, although they could be peened or bolted together, if it is not convenient to weld. The base plate is made large in area in order to allow enough room for

In order to increase production from this mold, a second set of cavity blocks may be made. One cooling fixture would be sufficient. One set of blocks is loaded in the press, and while the casting is curing, the operator removes the other blocks from the fixture and cleans them ready for use as soon as the set in the press is removed. This can be accomplished in less time than is required for curing. In order to keep the operator busy, he may perform the edging operation, which consists of filing the flash from the casting.

Glossary of

Plastic Mold Designing

This Glossary, begun as an aid for shop men who are interested in plastic mold design, has been compiled with the generous assistance of a number of leading designers in various parts of the country. Both Mr. Thayer and the Editor wish to thank the men whose response has made this first Glossary of mold design terms possible. Making no pretensions to completeness, the Glossary will be augmented from time to time.

—The Editor.

BULK FACTOR—the ratio of the volume of plastic molding compound before molding to volume of the finished molded casting.

CASTING—the finished product or molded part.

CAVITY BLOCK—the housing or lower mold section in which the mold cavity is sunk, either by machining or hobbing or both.

CAVITY BLOCK RETAINER PLATE—the plate on which the cavity block is mounted. The guide pins are mounted on this plate, which is usually drilled for steam or water lines (also called "lower steam plate").

CHASE—1. the part of a mold in which the molding compound is placed.

2. an enclosure of any shape, used to (a) shrink-fit parts of a mold cavity in place; (b) prevent spreading or distortion in hobbing; (c) enclose an assembly of two or more parts of a split cavity block in which the contour of the casting is undercut (with reference to the line of closing of the mold). Such loose pieces are ejected with the molded part or casting, then separated from the casting, cleaned and replaced to receive the next mold charge (chase is sometimes called "yoke").

CUT-OFF—the line of parting of a mold, where the two halves come together (this line is also called a "land" or "flash ridge").

EJECTOR PIN—a Knockout Pin.

EJECTOR PIN ASSEMBLY PLATE—a plate which backs up the pin plate and holds the ejector assembly together. A term used for injection molds (refer also to "knockout", "ejector pin").

EJECTOR PIN RETAINER PLATE—a plate which holds the ejector pins in an injection mold (refer to "pin plate", "knockout pin retainer").

FLASH—the portion of a mold charge which escapes from the mold proper as the mold closes.

FLASH GROOVE—a groove ground in a force to allow the escape of excess material. Sometimes used when fit between force and material well is too tight.

FLASH RIDGE—that part of a flash or overflow type of mold along which the excess material escapes when the mold is closed.

FORCE—the portion of a mold that enters the cavity block and which exerts pressure on the molding compound. The force is designated as "top force" or "bottom force" by the position it occupies in the mold assembly.

FORCE PLATE—the plate which holds the force. It is usually drilled for steam or water lines. The force plate ordinarily carries the guide pin bushings.

GATE—a groove or channel cut in the cavity block of an injection type mold to connect runner and cavity, and through which the molding material enters the cavity. (See "runner").

GRIDS—channel shaped C.I. parallels that hold the steam plates away from the press platens to allow for operation of the knockout assembly. They also provide air spaces between the steam plates and the press platens to prevent heat losses.

GUIDE PIN—a pin used to maintain proper alignment of force and cavity as the mold closes.

GUIDE PIN BUSHINGS—hardened steel bushings mounted in the soft steel steam plate.

HOB—a hardened steel master used to sink the mold shape into the mold machine steel cavity block.

KNOCKOUT—the device used to eject the finished casting from the mold. In some designs it also ejects split mold cavity parts or loose pieces.

KNOCKOUT FRAME—the framework which supports the knockout pins.

KNOCKOUT PIN—that part of a knockout device used to eject the finished casting from the mold.

KNOCKOUT PIN RETAINER—a bar used to retain a row or rows of knockout pins.

LAND—the horizontal bearing surface of a semi-positive or positive type mold, around the mold at the parting line, along which excess material escapes.

LEADER PIN—(see "guide pin").

LOOSE PIECES—parts of a mold cavity which undercut portions of a casting.

LOWER STEAM PLATE—(see "cavity block retainer plate").

MATERIAL WELL—space provided for in the mold cavity to take care of the bulk factor of the molding material.

MOLD—the assembly of parts that collectively function in the molding process.

MOLD CAVITY—that part of a mold into which the molding compound is placed and in which it is formed.

PARALLELS—(1) spacers placed between the steam plate and the press platen to support the middle section of the mold against bending under molding pressure; (2) spacers placed between the steam plates of a mold to control the closed height and to prevent crushing of the mold parts when the land area is inadequate.

PIN PLATE—a plate on which a number of knockout pins are assembled.

PLATEN OR PRESS PLATEN—the top and bottom plates to which the entire mold assembly is bolted (also called the "top press platen" and "bottom press platen").

PLUNGER—see Force.

PULL-BACK—a device to pull the press platen to the open position. Hydraulic cylinders are usually employed (see also "push-back").

PUSH-BACK—the hydraulic cylinders so arranged as to push the press platen back to open a press. The push-back cylinders are usually connected to the hydraulic high pressure supply at all times. They diminish the effective force of the main ram in proportion to their respective areas. Push-backs are used to hasten the opening of the press and to supply the force necessary to eject the molded parts.

RUNNER—a groove milled on the faces of the runner plate and cavity block to make a passageway from sprue to gate of an injection type mold. (See also "sprue", "gate").

RUNNER PLATE—an inserted steel plate in an injection type mold which carries the runner grooves, and bears against the mating plate on the ejection half of the mold.

SIDEBARS—same as "loose pieces".

SIDE DRAW PIN—a core pin which is used to core a hole in a direction other than the line of closing of a mold,

(Continued on Page 56)

Die Designing and Estimating

By CHARLES BOHMER
and
GEORGE DANNES

Article V of a New Series

Like the die designed and estimated last month, this type of double progressive emboss, pierce and blank die is adaptable.

This die for making a valve of stainless steel for a server, like all others in this series, is in actual service, having been designed and built in Mr. Bohmer's shop.
—The Editor.

Design and Estimate of a Double Progressive Emboss, Pierce and Blank Die

Analysis of Design and Application of Method for Estimating Time Required to Machine and Assemble Parts

Design

THIS type of die may be used for a great variety of parts whose contours can be interlocked and substantial savings of material and production labor should result.

Three stations of progression are used —first, the embossing, then the rectangular piercing and last the blanking. Each station is arranged and located for greatest possible die strength.

All piloting is done in the scrap and is accomplished by means of two round piercings in the first station and four pilots in the successive stations.

The die (1 and 20) is made of two parts, one having the blanking openings, the other the embossings and piercings, to lessen the danger of any possible change in hardening and for sharpening purposes.

The die openings for the embossings are worked through the die and a solid pad (10) inserted to assure a flat bottom. The piercing die openings are made by means of inserts as shown (9).

The embossing and piercing punches and the pilots (7-8-11-13) are of the headed type while the blanking punches (3) are of the straight type, and all are mounted into the punch pad (2). To hold the blanking punches securely against any tendency to pull out they are fastened to the punch holder by means of cap screws (4).

Since the embossing is formed down it is necessary to have the piercing surface below the die equal to the depth of the embossing and also necessary to provide clearance recesses in the surface of the die at each station to assure surface contact of the die and material.

The stripper (15) is of the solid type with a passage channel, machined to a depth that will allow clearance for the embossings, and in proper relationship to the die openings. The stripper is provided with guide bushings for the pilots (12) to prevent any shifting should the material be passed through incorrectly.

There are no provisions for stopping

on this particular die, with the exception of the primary stop in the first station, because the die is operated in an automatic feed press. However, if stops are required provisions for them should be made and the screws and dowels of the die and stripper located to provide for them.

In order to control the depth of the embossing, a bumper block (18) is provided and is fastened directly to the die shoe.

All cutting and forming sections of the die are made of hardened tool steel while the stripper (15), bumper (18) and punch pad (2) remain soft and the complete assembly is mounted on a standard type of leader pin die set.

In sharpening a die of this type, the same amount of material must be removed from the bottom of the form sections and bumper as from the top of the cutting sections to maintain the proper relationship of depth.

Estimate

MACHINING AND FINISHING

Column A—for time values see Table, Fig. 6

	Machining hr.	Grinding hr.
DIE—Det. 1—1" x 4" x 6" H.C.-H.C. TS	.9	1.1
DIE—Det. 20—1" x 6" x 5¼" H.C.-H.C. TS ...	1.0	1.2
PUNCH PLATE—Det. 2—⅞" x 5" x 9" CRS..	.8	.5
STRIPPER—Det. 15—½" x 6" x 9" CRS....	.8	.5
PUNCH—Det. 3—1" x 2¼" x 2¼" H.C.-H.C. TS (2 required)	1.2	1.6
BUMPER—Det. 18—1½" x 3" x 7½" CRS.	.6	..
	5.3	4.9

TOTAL Column A ..... 10.2 hrs.

DRILLING ALL HOLES EXCEPT FOR PERFORATORS AND PILOTS

Column B—for time values see Table, Fig. 7.

DIE—Det. 1—4 screws, 3 dowels (add 25% for H.C.-H.C.) ..... 1.0 hr.
DIE—Det. 20—4 screws, 4 dowels (add 25% for H.C.-H.C.) 1.1
PUNCH PLATE—Det. 2—4 screws, 4 dowels.. .9
STRIPPER—Det. 15—4 screws, 2 dowels 7
DIE SHOE—10 screws (including 2 for bumper 19), 4 dowels 1.5
PUNCH HOLDER—4 screws, 4 dowels 9

TOTAL Column B ..... 6.1 hrs.

LAYOUT AND INSPECTION

Column C—for contour time values see Tables, Figs. 9, 10, 11, 12.

Layout

DIE—Det. 1—2 x 11 units ..... 2.2 hr.
DIE—Det. 20—2 x 2 units (clearance) 4
2 x 4 units (slots) 8
EMBOSS—2 x 7 units (assuming center part to be a perfect radius which can be bored).. 1.4

Inspection

DIE—Det. 1—± .005" (2 × .5 hr. + 2.2) ..... 3.2 hr.
DIE—Det. 20—
(2 × .5 hr. + .4) 1.4
(2 × .5 hr. + .8) 1.8
(2 × .5 hr. + 1.4) ... 2.4

TOTAL Column C ..... 13.6 hrs.

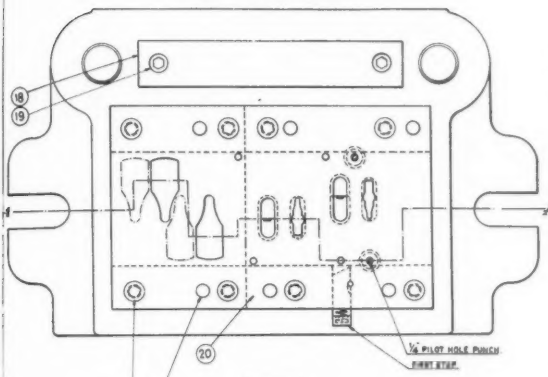
MACHINING, FINISHING AND FITTING DIE PARTS

Column D—use contour units as established for Column C, also drawings and Tables, Figs., 13-20.

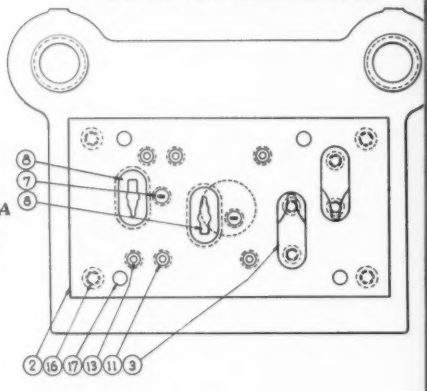
MATERIAL REMOVAL

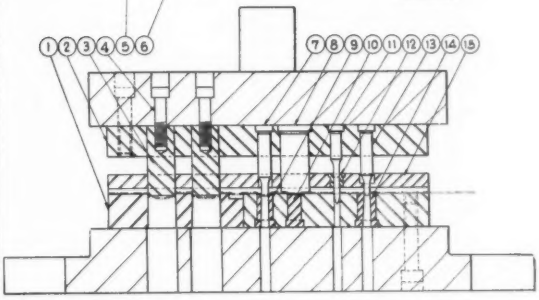
	Machining hr.	Finishing hr.
DIE—Det. 1—2 x 11 units, size 4" (Fig. 14)	16.0	1.6

Plan View of Die

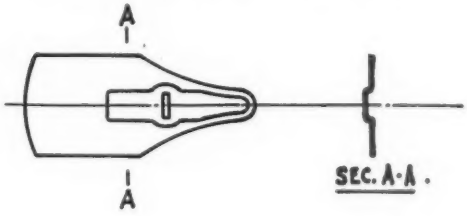


Plan View of Punch—Inverted





Section on Center Line of Die Assembly



Valve for Server, Material .020" Stainless Steel

MATERIAL LIST

Det.	Req.	SIZE & MATERIAL	Remarks
1	1	1" x 4" x 6" H.C.-H.C. DIE TS	Hdn. & Gr.
2	1	⅜" x 5" x 9" PUNCH PLATE CRS	
3	2	1" x 2¼" x 2¼" H.C.-H.C. PUNCH TS	Hdn. & Gr.
4	4	⅜"–11 x 1¼" SOC. HD. SCR.	Stock
5	8	⅜"–16 x 1¼" SOC.HD.SCR.	Stock
6	7	⅜" DIA. x 2" DOWELS	
7	2	SLOT PUNCHES	
8	2	FORM PUNCHES	
9	2	SPLIT SLOT INSERTS	
10	2	FORM PUNCH ANVIL INSERTS	
11	4	PILOT PINS	
12	4	PILOT PIN BUSHINGS	
13	2	PILOT HOLE PUNCHES	
14	2	PILOT HOLE BUSHINGS	
15	1	½" x 6" x 9" STRIPPER PLATE CRS	
16	4	⅜"–16x1¼" SOC. HD. SCR.	Stock
17	4	⅜" DIA. x 1¼" DOWELS	
18	2	1½" x 3" x 7½" BUMPER CRS	
19	4	⅜"–16 x 2" SOC. HD. SCR.	Stock
20	1	1" x 6" x 5¼" H.C.-H.C. DIE TS	Hdn. & Gr.

Fig. 48. Double Progressive Emboss, Pierce and Blank Die, Designed by E. Taylor, Courtesy: Federal Tool Corp., Chicago, Ill.

DIE—Det. 20—2 units, size 2", 2 required (Fig. 14) (clearance) 8.0 .8
7 units, size 2", 2 required (Fig. 14) 10.0
(Fig. 15) (emboss) .. 1.1
2 units, size 2", 2 required Type 2
PUNCH, (Fig. 16) (insert for emboss) .. 9.6
2 units, type 2, size 2"
See — type 2 PUNCH

—size 2", (2 x 4.8 = 9.6) (Fig. 16) 9.6
5 units, type 2, size 2" 2 inserts required 11.0

SUB-TOTAL Column D .....67.7 hrs.

STRIPPER—
OPENINGS FOR DIE SECTION—Det. 1—11 units, size 4" (2 required) 3.6
OPENINGS FOR DIE SECTION—Det. 20—for emboss,

DIE WORK ESTIMATING SHEET

	A	B	C	D	E	F
Det. 1 DIE	.9 1.1	1.0	2.2 3.2	16.0 1.6		1.5
Det. 20 DIE	1.0 1.2	1.1	2.6 5.6	48.2 1.9		1.5
Det. 2 PUNCH PLATE	.8 .5	.9				4.0
Det. 15 STRIPPER PLATE	.8 .5	.7				
Det. 3 PUNCH	1.2 1.6			21.6 3.0		2.0
Det. 18 PUMPER	.6					.5
DIE SHOE		1.5		5.4 2.2		
PUNCH HOLDER		.9				
Det. 7 SLOT PUNCHES				5.0		2.0
Det. 8 FORM PUNCHES				12.0 3.0		2.0
STRIPPER						
Det. 1				3.6		
Det. 20				1.6 .4		
PERFORATORS					1.4	1.0
PILOTS					2.8	2.0
PERFORATORS and PILOT HOLES					5.4	
FINGER STOP					3.0	
PILOT BUSHINGS					2.0	
INSERTS						3.0
TRYOUT						10.0
DEVELOPMENT (Emboss)						10.0
	10.2	6.1	13.6	125.5	14.6	39.5

Total 209.5 hrs.

Fig. 49

PUNCHES—Det. 3—11 units, size 4", type 2, (2 required) (Fig. 16) 21.6
Det. 7—4 units, size .5", drill rod (2 required) (Fig. 16).. 5.0
Det. 8—7 units, size 2", type 2, (2 required) (Fig. 16) ... 12.0
PUNCH PLATE:
FOR PUNCH—Det. 8—6 units, size 4", (2 required) 3.0
FOR PUNCH—Det. 3—6 units, size 4", (2 required) 3.0
2 units, size 2" (2 required) 1.6
ROUND HOLES, 2 4
DIE SHOE
OPENINGS FOR DIE—Det. 1—11 units, size 4" 5.4
OPENINGS FOR DIE — Det. 20—ROUND HOLES 4
STRIPPER SLOT 1.8

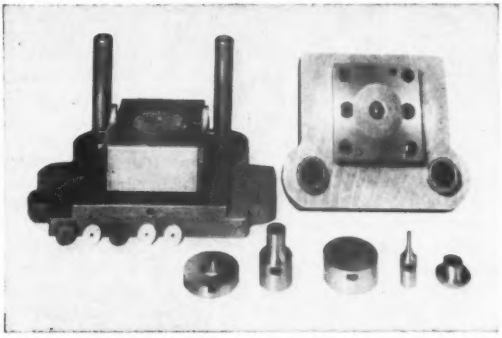
TOTAL Column D .....125.5 hrs.

(Continued on Page 56)

97 *Different* Sizes of Washers from *One* Die

in such materials as cold rolled steel, stainless steel, brass, lead, copper, bakelite, vellutex, phenol and paper. This is possible with only five interchangeable parts in a

HOVIS INTERCHANGEABLE COMPOUND WASHER DIE



The five interchangeable parts that make a complete washer are shown below the die.

The patented *Hovis Interchangeable Punch and Button Die Method* makes all cutting parts, knockout and stripper easily removable and replaceable by the use of Standard Hexagon Socket Head Screw Wrenches. All interchangeable parts are held in the die by the Hovis patented punch retaining mechanism. Complete change of parts to make a washer is a matter of minutes. There is no dismantling of the die.

Complete Compound Washer Dies are available in four standard sizes. Shank size and shut height of die to fit your press. All standard interchangeable parts made from special alloy carbon-vanadium punch steel. High speed steel parts for cutting stainless or high carbon steel can be furnished.

Price list of Hovis Standard Compound Washer Dies and Interchangeable Parts or General Catalog of Punches and Retainers mailed promptly on request.

HOVIS SCREWLOCK CO.

3129 Larned Street, East **Detroit, Michigan**

When you order or write about products described in TDM PROGRESS please mention the publication.

A **Reader Requested** Article

The Place of Portable Power Tools in the Tool Room and Die Shop

By Michael Labas, Electric Tool Div.
The Stanley Works

PORTABLE electric tools are rapidly replacing the old, tedious hand method of doing many jobs in tool rooms and die shops. Such work as filing, external and internal grinding on dies, punches, patterns and templates, precision parts can be done faster and better with electric tools at lower cost.

Modern production requires accuracy for interchangeability. There are hundreds of uses for portable electric tools in plants that assemble products. Shops and plants that build special machines and precision parts find many uses for such tools. But, since it is in the tool room and die shop that the standards of accuracy are established, the portable tools perhaps get their most exacting service there.

Tool rooms and die shops are more interested in quality than production. Tool and die makers find that portable electric tools do good smooth finishing work. The time saved permits the shop to do more work and to quote lower prices.

Although some handwork must usually be done in finishing, a recent portable electric tool with a reciprocating movement to be used in taking off the last thousandths in special machine production, die sinking, tool and plastic mold making has appeared. It is claimed that this tool is a practical substitute for close limits handwork.

Another factor in favor of the portable electric tool is the ease of handling. Men accustomed to hand work quickly adjust themselves to its operating characteristics. Less skilled labor usually can do efficient work on the power tools much more quickly than they can be

Fig. 1—A flexible shaft grinder making quick work of finishing a die mold. It increases the production of skilled workers, and also permits less highly skilled men to do this type of work.

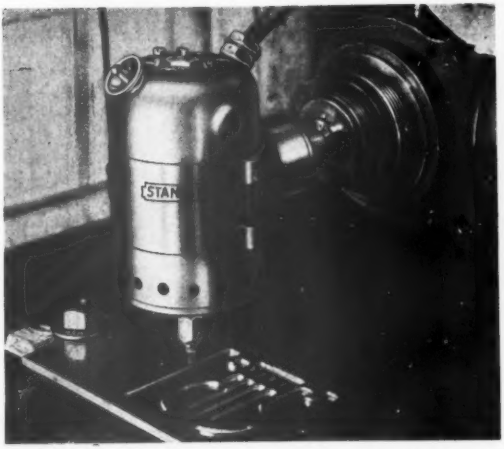


Fig. 2—A tool room grinder mounted on a lathe recessing and milling a brass templet. This setup suggests many other uses.

trained to work with hand tools. For this reason unit labor cost is also reduced.

Although it is not practicable to set up actual figures in time saved generally, each shop that uses one or more portable electric tools will be able to work out by means of their job tickets just how much time and labor can be saved on their typical operations. This saving will contribute to the net profit earned on a job or on highly competitive business it can be passed along to help get jobs that were lost previously.

There are three types of portable grinders that have their definite place in the tool and die shops. A Flexible Shaft Grinder is extremely handy, due, in part, to the long flexible shaft which enables a large area to be reached without moving the tool or the work to the tool. A motor capable of 18,000 R.P.M. is fast enough to do a very good job of fast grinding on tools, dies, patterns and castings and countless external and internal operations. The chucks accommodate high speed rotary files, mounted points, emery wheels and spindles for internal grinding. A combination bench and over-head holder is usually furnished which will hold the grinder on a bench or it can be suspended overhead out of the way and yet within easy reach.

Fig. 1 shows a typical use of the Flexible Shaft Grinder. It is being used to grind a die.

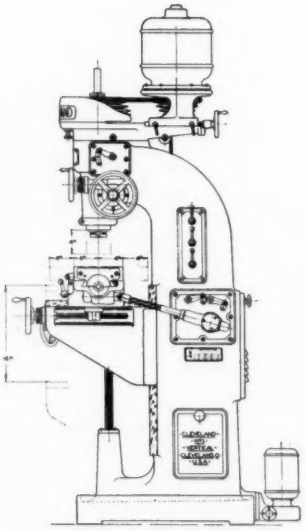
Another power tool that is steadily winning favor is the Tool Room Grinder. The versatility of this tool lends itself to a multitude of uses. A motor capable of 18,000 R.P.M. gives ample power for doing accurate, smooth work. This tool can be fastened in various positions in a milling machine, shaper or lathe and can be used for external and internal grinding on dies, punches, special machine parts, spiral cutters, lathe centers, etc. A cable furnished with the motor unit enables the tool to be used free hand as an aerial grinder.

Used in a special stand the Tool Room Grinder becomes a time saver on punch

(Continued on Page 52)

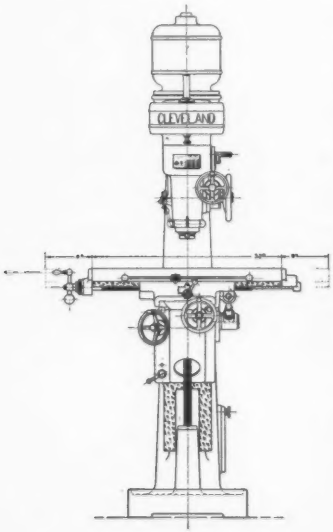
Fig. 3—A contour grinder which does away with most hand filing and hand stoning. The operator here is outlining a brass templet.

Sommer & Adams Announces New Vertical Milling Machine



THE Sommer & Adams Company this month formally announces the first of its new line of standard Vertical Milling Machines—the Cleveland No. 1.

This machine, designed and built to offer the trade a small, rigid, high-speed vertical spindle milling machine accurately built, has all the essential features needed for this type of machine. The vertical spindle of chrome nickel steel, heat treated and accurately ground, is mounted on Pre-Loaded Precision Ball Bearings in an accurately ground quill. This quill has a vertical adjustment of four inches by means of a rack and pinion. The pinion can be rotated direct by a large hand wheel or by a small hand wheel attached to a worm, driving it through a worm wheel which can be clutched or declutched at will. The spindle is driven direct from a flange mounted motor through a four step cone pulley and "V" belts. There is provided also a two-speed gear box between the cone pulley drive and the spindle. With this arrangement, it is possible to get four high speeds direct by the pulley drive and eight additional speeds through the double-back gear, making a range of twelve speeds from 100 RPM to 1850 RPM. If desired, a two-speed motor could be used which would double the number of speeds.



The knee, accurately scraped and fitted to the column, has a long bearing to insure rigidity. The knee is attached to the saddle that carries the table. The table is also scraped and properly gibbed to the saddle. The table is provided with three T-slots. Table has an automatic longitudinal feed which is driven through a gear box and is provided with twelve changes of feed. This gear box is driven by an individual motor located in the column of the machine.

The base of the machine is cored out to form a reservoir for the coolant which is picked up by means of a pump and delivered to the work. There is also a connection from the table to return the coolant to the base. Both the cross feed screw and the table screw are mounted on double row Timken bearings which allow free movement of the screws, making the machine more sensitive in operation, particularly when using small mills. All screws are provided with dials graduated to read in thousandths of an inch. The machine

(Continued on Page 37)

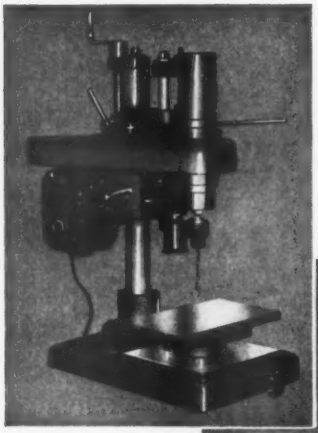
When you order or write about products described in TDM PROGRESS please mention the publication.

HAMILTON-MUEHLMATT

America's Finest

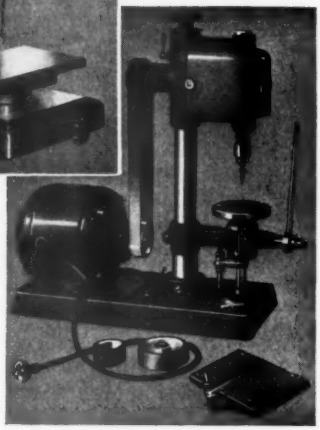
Sensitive Drilling and Tapping Machines

Better
Seeing.
Feeling.
Drilling



Extreme convenience of operation, bold design and sturdy construction plus perfect workmanship assure long, accurate life for the Maxi-Jr. Super Sensitive Drilling Machines.

These machines, used all over the world for a generation, set the standard for drilling small holes (.004" to .250" diameter).



Better
Seeing.
Feeling.
Tapping

The Hamilton-Muehlmatt Sensitive Tapping Machine is so efficient that there is no comparison with any other tapping device. The machine is "fool-proof", a shopman can become an expert operator in one hour.

Two tables, a 4" round and a 4" x 8" rectangular, as shown are furnished. Tap capacity—smallest to 1032 inclusive.

For more precision work with less effort the Hamilton-Muehlmatt Sensitive Drilling Machines and Tapping Machines are prime tool room and die shop investments. At the same time their sturdiness makes them economical on production work.

At a time when shops anticipate capacity work for months to come, the Hamilton-Muehlmatt Machines are a long term protection for precision work.

Full information on either of these machines will be sent promptly on request.

THE HAMILTON TOOL COMPANY

A. MUEHLMATT DIV.

224 North B Street **Hamilton, Ohio**

When you order or write about products described in TDM PROGRESS please mention the publication.

GORTON DUPLICATORS

Double cylinder head output

A French airplane engine builder *doubled* production of cylinder heads by using Gorton Duplicators for milling combustion chambers. (12 minutes each, floor to floor.) Shape was irregular oval with an undercut (see sketch). Material was cast aluminum alloy. This difficult shape was machined on standard Gorton Duplicators with simple, inexpensive fixtures. Write for Bulletin No. 1319-B.

George Gorton Machine Co.
Engineering Research Dept.
1119 13th St., Racine, Wis.

Please send me bulletin No. 1319-B with complete information on Gorton Duplicators.

Name.....

Position.....

Firm Name.....

Street.....

City.....

State.....

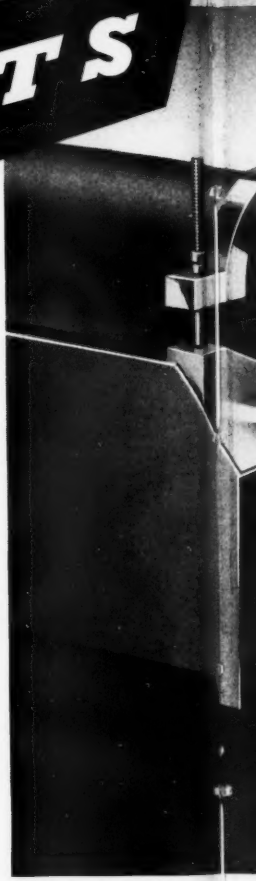
GORTON

Mail Coupon Today ➡

GEORGE GORTON MACHINE CO.
1119 13TH STREET, RACINE, WISCONSIN, U. S. A.

When you order or write about products described in TDM PROGRESS please mention the publication.

Empco PRODUCTS



FEATURES

Equipped with Micromatic Hone, producing mirror finish.

Extreme accuracy through entire length of work.

Powerful and economical.

Easy to operate—no expensive set-ups.

Simple feed and speed changes.

Hardened alloy steel parts throughout.

CAPACITY

3 to 12 inch diameters, lengths up to five feet.

A mechanically operated Honing Machine built for Tool Room or Production use.

Thoroughly tested and proved in our own plant.

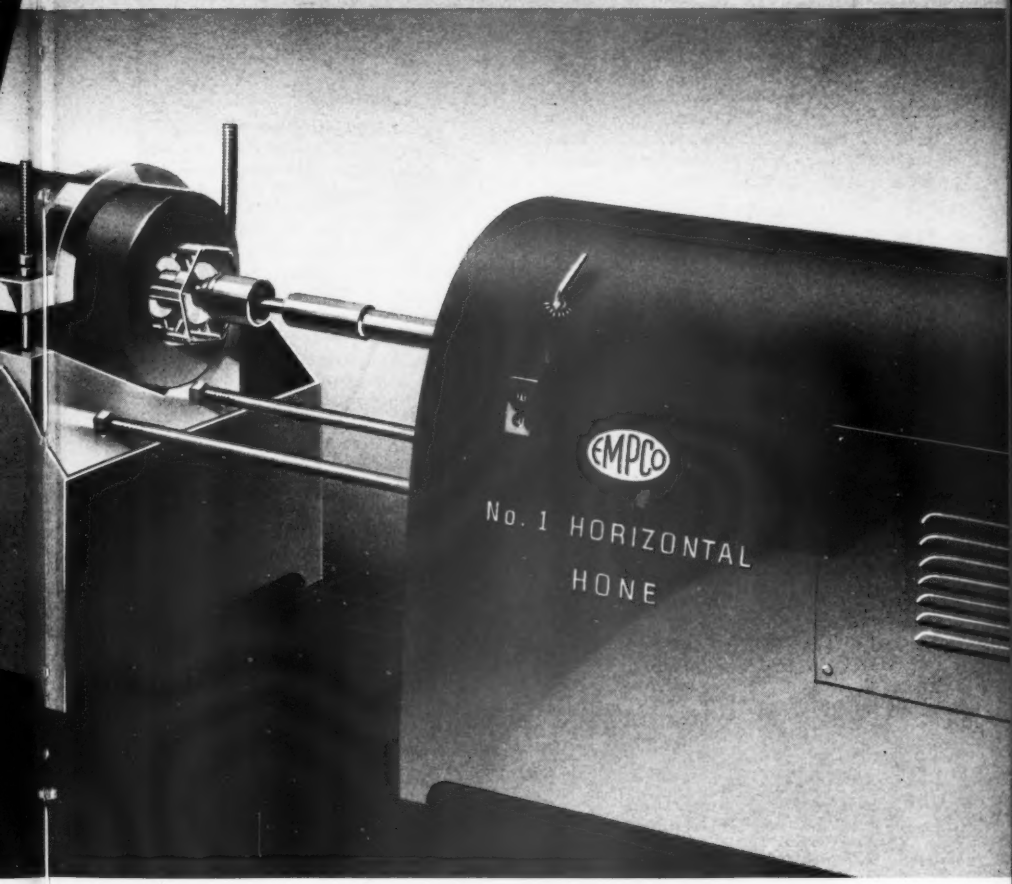
Full particulars upon request.

ENTERPRISI

Manufa
Milling

2731 Jerome Ave.

NEW UNIVERSAL
HONING MACHINE



PRISE MACHINE PARTS CORPORATION

Manufacturers of Repair Parts for Power Presses, Grinders,
Milling Machines, Automatic Lathes and Screw Machines, etc.

e Ave. **Detroit, Michigan**

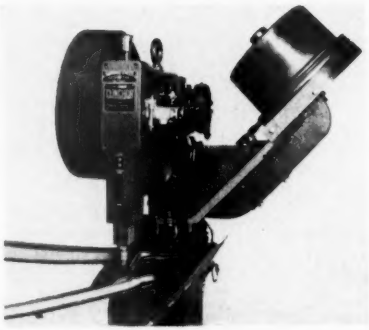
Automatic Feeding and Setting of Clinch Nuts

VARIOUS types of automatic feed hoppers for clinch nuts have been installed on general purpose presses. Like all makeshift arrangements the efficiency varied with each set up. Such makeshift arrangements had the habit of failing at critical times. A separate machine to do the entire setting operation was needed.

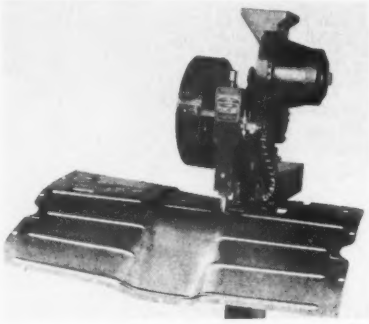
The "Clinchor" was developed to meet this specific need. Records show that this machine is answering the demands for more efficient setting of all types of clinch nuts and increasing production from three to five times and definitely minimizing spoilage. Designed originally for the "case" and "D" types clinch nuts, the "Clinchor" is now used to automatically feed and set practically all the later clinch nut types developed.

On these machines the clinch nuts are hopper fed to a position just ahead of the transfer ram. The transfer ram is operated by an air cylinder whose operation is automatically actuated to advance the nut into its position on the anvil. This action takes place at the end of the machine operation cycle and after the ram has set the nut in the work. The operator lifts the work with the clinch nut set in place to clear the next nut which immediately advances to the anvil.

The inclined drum type hopper operates through a ratchet drive direct from the flywheel. This introduces a continuous agitation of the nuts and assures a positive feed to the transfer ram. The construction of the tooling assures the correct position of the nut in relation to the work. For example, the flat side of the D nut is always in the same relative position when delivered to the anvil. The machines will not repeat until the operator releases and again depresses the pedal. An automatic brake is provided to stop the crank after it completes each revolution. The transfer ram cylinder may be operated manually by hand valves conveniently mounted on the side of the frame just ahead of the hopper.



A typical installation, feeding and setting a Fabri-Steel nut in an automobile deck door inner panel.



The versatility of the machine is shown, tooled to automatically feed and set automobile accelerator pedal buttons in toe and floor panels. The machine is capable of 190 strokes a minute.

The automotive industry is the largest present user of clinch nuts of all types and uses the "Clinchor" for setting nuts in such parts as dash, inside door, floor and hood panels, door pillars, battery and radiator supports, fenders and windshield frames. However, the advantages of "Clinchor" for many assembly operations are recognized by high production shops and plants in many industries and this improved method of setting all types of clinch nuts is lowering costs on many old as well as new assembly operations.

For full information on the "Clinchor" write the Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Mich.

Government to Begin Metal Industries Training

J. W. STUDEBAKER, director of the Federal Office of Education, announces a plan for training 1,250,000 men and young men for places in the metal industries that will be engaged in national defense work. The tentative program involves an expenditure of $127,600,000 for the coming fiscal year.

Mr. Studebaker states that $50,000,000 will be used for training equipment; $21,600,000 to retrain new men now in industry; $27,000,000 for extension of school hours during the winter; $15,000,000 for summer schools and $14,000,000 for engineering colleges. In discussing the plan, Mr. Studebaker emphasized that the program is not designed to interfere with regular courses in schools or with regular apprentice or other shop training plans, but that additional men in each case would be trained.

"Funds," Mr. Studebaker continued, "will not be distributed to states on a population basis but rather on a basis of obvious needs of industrial expansion. The states will not be required to match funds."

Although not announced to date, it is likely that the Office of Education training plan would be under the supervision of the Co-ordinator of Non-Combatant Employment, Sidney Hillman, recently appointed to this post on the President's Defense Advisory Commission.

It is known that the Ordnance Department, through their regular district office procurement planning work, has placed dies and tools in several machine tool builders' plants for a number of simplified and single purpose machines. As many of these machines could be operated by men after short training periods, it is likely that such training will be given a high priority.

New S. & A. Vertical Mill

(Continued from Page 30)

is attractively designed and accurately built, and will meet the popular demand for a small high-grade machine.

For further information write the Sommer & Adams Co., 18511 Euclid Ave., Cleveland, O. (Also see advertisement inside back cover.)

Airplane Wing Parts Held in Position for Welding!

Another application for De-Sta-Co, quick-acting toggle clamps, the efficient method for holding parts during production, as for welding, drilling, reaming, machining or assembly operations. Many large plants now standardize on De-Sta-Co clamps; hundreds of small shops use them regularly. Complete line, all sizes. Send for Bulletin No. 40—illustrates clamps and shows uses.

DETROIT STAMPING CO.

Established more than 25 Years

3443 West Fort Street Detroit, Michigan

When you order or write about products described in TDM PROGRESS please mention the publication.

New Hamilton Super Sensitive Drilling Machine

THE new Hamilton-Muehlmatt Super Sensitive Drilling Machine departs most radically from anything heretofore offered in range of speed, sensitivity, ease of operation, and all-around performance.

The speed adjustment is infinitely variable in two ranges of speeds. These two ranges are provided for by use of a 2-step driving pulley and a 2-step spindle pulley. This assures a slower range of speeds for the larger drills and a higher range of speeds for the smaller drills down to .004".

The complete speed range of the machine is from 840 RPM to 9300 RPM with a constant speed 1725 RPM motor providing the power. This machine can also be furnished with a higher minimum and a greater maximum speed by merely changing the driving pulley and belt.

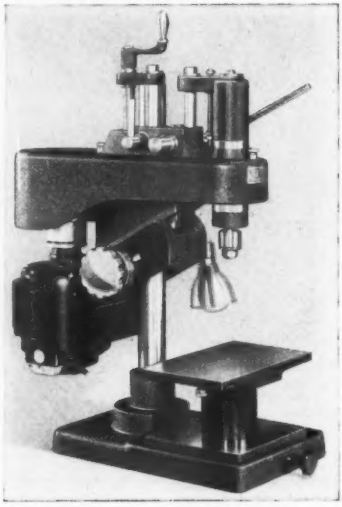
A graduated speed dial on the speed changing hand wheel shows the speeds at which the spindle is operating. Speed changes are made in either of the two speed ranges almost instantaneously.

This is a machine tool built with "instrument precision" and can be used with confidence on the finest work done in tool rooms, instrument, diesel, electrical, aircraft, and many other precision manufacturing plants.

In the new Super Sensitive Drilling Machine convention has not been permitted to dwarf the efforts of the builder. It is bold in design. Extreme convenience of operation enhances its usefulness; its sturdiness, coupled with perfect workmanship, assures long accurate life.

The drilling unit is self contained, and swings radially on the column and locks to any position. All controls are manually operated.

The 6½" vertical adjustment of the drilling unit is accomplished by means of an elevating screw. The convenience of this feature will be appreciated where vertical adjustments occur frequently.



Whether used in the production department, the laboratory, the tool room, or as an all-purpose machine in the shop, the manufacturer states that its performance will measure up to all expectations.

For literature or other information on the Hamilton-Muehlmatt Super Sensitive Drilling Machine, write The Hamilton Tool Co., 224 North B Street, Hamilton, Ohio.

Crucible Steel Offers Rexalloy Tool Bits

REXALLOY, a cast non-ferrous cutting alloy said to possess remarkable qualities of thermal stability and resistance to abrasive wear, now offered in Tool Bit form has been announced by Crucible Steel Company of America. With its basic elements of cobalt, chromium and tungsten accurately balanced and controlled Rexalloy is so hard at elevated temperatures that it is practically unforgeable. Hardness and structural stability at extreme temperatures is remarkable in that exposure to 2000°F. lowers the Rockwell C scale hardness only one point. Rexalloy possesses superior resistance to abrasive wear. A new standard of toughness in cast cutting tools has been achieved through controlled melting and casting.

Rexalloy Tools Bits may be used on practically all machining operations, turning, facing and boring of steel, malleable iron, cast iron and nonferrous metals. The manufacturer states that Rexalloy may be used on high speed production machines when sufficiently supported, that proper grinding is readily accomplished with ordinary tool room equipment and that tool cutting angles customarily used for high speed tool bits may be used. Rexalloy Tool Bits are available in standard sizes and lengths and special lengths and numerous square and rectangular shapes.

A booklet giving data and illustrations of applications, suggestions on the proper use of Rexalloy Tool Bits, tables on speeds and feeds for various materials is available on request. Nearly 30 branches and warehouses distributed throughout the country make Rexalloy Tool Bits service fast and easy.

For a copy of the booklet on Rexalloy Tool Bits, write Crucible Steel Company of America, 405 Lexington Avenue, New York, N. Y.

Warner & Swasey Adding to Plant

The Warner & Swasey Company, manufacturers of turret lathes, announce their second expansion in plant space within six months, the latest addition to add 50,000 square feet to the plant. Most of the new space will be used for assembly. The previous expansion was 30,000 square feet.

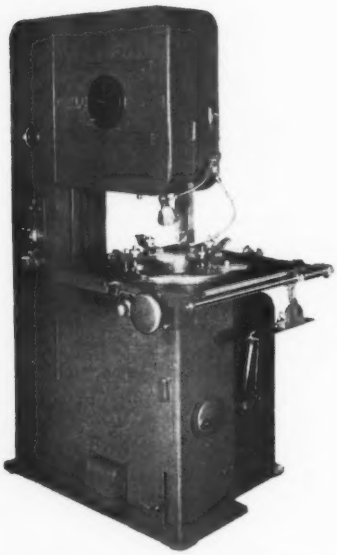
Plan of battle or plan of production . . . both alike depend on precision to win. More and more do production lines and tool rooms rely on Dumore Grinders for obtaining accuracy to a tenth (.0001"). The resultant savings of labor and overhead . . . the reduction of spoilage . . . the ready adaptability to myriad applications have made Dumore Grinders the rule. Call on your nearest Distributor for consultation on any grinding problem and a demonstration of any Dumore tool, right in your own plant.

THE DUMORE CO.
Dept. 370-F, Racine, Wis.

No. 44 "Toolmaker"

Dumore PRECISION Grinders

*Only Dumore gives you all of these: Easy portability *speeds to 42,500 r.p.m. *wide selection of quick-change quills *15 models to select from *25-year background *distributors conveniently located.*



Continental Introduces New "Super DoAll"

CONTINENTAL Machines, Inc., announces the new "Super DoAll" featuring a new power work feed and other improvements and features that make this model an even more versatile and outstanding machine tool. The work feed created for this model not only draws the work into the saw but mechanically controls the curvature of the cut with a hand wheel. This achievement gives complete flexibility and eliminates the necessity of the operator doing hand guiding and gives complete mechanical control.

This model accommodates saws up to 1" wide as well as the usual range of narrow saws, $\frac{1}{16}$" up to ½". A full set of life-time DOALL saw guides is furnished. An improvement in these guides places them even closer above and below the work. An outstanding feature of these adjustable guides is that they securely hold any thickness of band used. The "Super DoAll" is furnished with 3 widths of file bands, ¼", ⅜" and ½". An assortment of 21 types of file bands is available in these 3 widths. Also, 3 abrasive polishing bands are standard equipment.

Saws, files and polishing bands are fully guarded to the point of work. A large convenient rear cover may be removed from the machine to give complete accessibility to the interior. In the base of the cabinet is the 1½ HP motor which is hinged with the other side free floating for smooth operation. A ¼ HP motor is mounted in the column to operate the grinder for the automatic DOALL butt welder.

The illuminated magnifying attachment is standard on this model. A remote control push button starting switch is conveniently located. A wiring box is furnished so that the machine is shipped ready to attach wires and operate. In addition to the new power work feed, the standard DOALL variable work feed is included, as well as the hand screw feed.

Numerous other improvements and refinements make this particular model an outstanding, all-round machine tool. The transmission has helical cut steel gears, is splash lubricated, with clutch parts hardened, all totally enclosed. The patented Speedmaster pulleys, which deliver the wide range of variable speeds necessary, are now made of "High Impact" Black Bakelite which give extra long belt life. The 26" wheels of this model are super balanced cast aluminum with recessed "neoprene" tires.

With this model the DOALL storage cabinet is furnished as standard equipment. The cabinet makes it easy to keep an inventory of supplies.

This new model is furnished complete with cut-off and mitering attachment, automatic disc cutting attachment, rip fence, electric etching pencil, table tilt compensator, a heavy work slide, a device to handle heavy work more easily, and tools.

For further information or the name of your nearest DoAll dealer, write Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.

Enterprise Announces New Universal Honing Machine

ENTERPRISE Machine Parts Corporation announces their new Universal Honing Machine, equipped with Micromatic Hone and employing the horizontal principle which permits honing of the entire length of the work in a single operation. The No. 1 Horizontal Hone, as the new machine is designated, is the perfected model of the horizontal honing machine used in this company's shop for over 2 years.

The hone itself floats on spindles with ball joints insuring perfect concentricity. It is extremely accurate throughout lengths up to five feet. Capacity work range includes holes from 3" to 12" diameter. An efficient coolant system makes a higher honing speed practical, an important feature.

For the first time the new Universal Honing Machine makes it possible for the manufacturer or builder to achieve economy and perfection in honing sizable cylinders. The machine is easy to operate, there are no expensive set-ups, feed and speed changes are easily and quickly controlled and hardened alloy steel parts are used throughout.

For full information on the new Empco Universal Honing Machine (No. 1 Horizontal Hone), write Enterprise Machine Parts Corporation, 2731 Jerome Ave., Detroit, Mich.

Production Show in Cleveland

(Continued from Page 15)

Delta Mfg. Company
Milwaukee, Wisconsin

Doelger & Kirsten, Inc.
Milwaukee, Wisconsin

Dumore Company
Racine, Wisconsin

Eastern Cutter & Salvage Co.
Newark, N. J.

Fulton Foundry & Machine Co.
Cleveland, Ohio

Grob Brothers
Grafton, Wisconsin

Hamilton Mfg. Company
Two Rivers, Wisconsin

(Continued on Page 44)

YEARS AHEAD IN DESIGN

Vernon Combination

VERTICAL MILL & JIG BORER

The *NEW* VERNON VERTICAL

—with slow or rapid traverse to quill.

It's streamlined—advanced in design—positively the latest tool of its kind. Easiest to operate. Substantial pyramid pedestal. Ball bearing equipped throughout. Quill arranged for slow hand-feed (graduated to .001"), or rapid one-to-one traverse can be *quickly engaged* by turning knob and using handle. Score of other improved features. *Write for Bulletin and price.*

8 spindle speeds—range 250 to 4200. Table size, 6" x 21". Maximum distance, Table Top to spindle end, 10½". Movement, sliding head, 10½". Vertical travel of quill, 3". Longitudinal Table Travel, 12". Cross Table Travel, 6". Saddle Length, 11". Motor, ½ h.p., 60 cycle, 1750 r.p.m.

The Vernon Line of MILLING MACHINES & 11" SHAPERS

MACHINERY MANUFACTURING CO.

DEPT. 40, P.O. BOX 155, VERNON BR., LOS ANGELES, CALIF.

When you order or write about products described in TDM PROGRESS please mention the publication.

Replacing Dies That Wear Out Every Day

By Harlow Klema
George Gorton Machine Co.

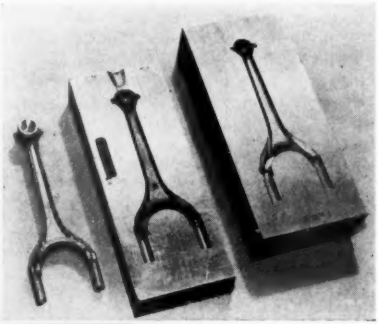
IN the production of automobile connecting rods it is a problem to keep replacing drop forging coining dies with dies equally as accurate. Almost as great is the need to replace them economically, for one set is worn out nearly every working day.

After trying various ways of making replacement dies, with all kinds of equipment, it was determined that they could be made cheaper, faster and more accurately on a Gorton Die and Mold Duplicating machine. This machine reproduces any shape master full size, within close tolerance limits. Basically a milling machine, it reproduces through the use of a tracer arm and a free floating table, which may be moved in any direction in the horizontal plane.

While the tracer arm guides the workman, he moves the table with his right hand, through the use of a hand lever, and follows the outline set by the tracer. Because of the extreme sensitivity of the table, only slight pressure is required on even the heaviest cuts.

Through this method it was found that the dies could be produced in seven hours per half, and held to limits of .0025". Just enough stock was left for cleaning and polishing. The dies are made of Sparta Tool Steel.

The set-up is simplicity itself. The master is set up on the master table of the duplicator (shown at right in the photograph), and the work is then placed on the work table in approximately the same relationship to the cutter spindle as the master is to the tracer spindle. Both are then clamped. Then through the use of the master table



Above: The two halves of the connecting rod die block, with a lead striking made from it at the left.

Left: One-half of the die block is shown in the machine ready for final duplicating. The master is to the right.

micrometers the master and work are lined perfectly, the positions being checked through tracing styles of the same diameter.

In the first operation, the largest possible cutter was used for roughing out the large cavity. For this operation the duplicator table was locked and the same procedure followed as in ordinary milling. Because of the toughness of the metal the roughing cuts are faster when done in this manner.

Then, without disturbing the setting of either the master or block, the duplicator table was released so it was ready for duplicating with the hand lever. During all these operations the tracing styles used were slightly larger than the cutters, to prevent gauging or undercutting.

This much of the operation on one half consumed about one and one-half hours. In the final duplicating, the time consumed was determined by the finish desired. More or less time could have been consumed depending whether speed or finish were most important. In this case, the finish left but a minimum of hand work.

Except for the roughing cut, when a 2-flute ball nose cutter was used, ball nose ground tooth burrs were used for the entire job. These were used because the multiple teeth kept constant contact with the work and required less pressure of the tracer against the master.

After the first half of the die was completed, it was a simple matter to locate all additional die blocks, for they were merely placed against two semi-permanent stops and then clamped down.

(Continued on Next Page)

Complete Die Builders' Service

Producto Standardized Interchangeable Die Sets

Prompt shipments from our own assembly plant in Cleveland.

Cerromatrix Low-temperature-melting metal alloys for locating
Cerrobend and securing punch and die parts. Economical,
Cerrobase save time, reduce cost.

Precision-Standard Die Springs designed and manufactured to meet exacting tool and die standards.

We are now distributors of

HOVIS Standardized PUNCHES, BUTTON DIES and RETAINERS

The patented SCREWLOCK principle makes the HOVIS the simplest, strongest quick change retainers made.
For the die builder it is the easiest to install, the safest to guarantee.

Send for catalog and investigate

Complete Stock of Die Accessories

Prompt and dependable delivery service.

DIE SUPPLY COMPANY

Telephone CHerry 6818

1390 East 30th St. Cleveland, O.

When you order or write about products described in TDM PROGRESS please mention the publication.

Speed and Accuracy,
Real Profits with an

OLIVER DIE MAKING MACHINE

S-1 Direct Drive

The rugged, "convenient-to-work" Oliver Die Making Machine is turning out more work in less time for many die shops and departments. The versatility of these machines keeps them busy on all types of sawing, filing and lapping in both small and large shops. (More than 10,000 in use).

Oliver Die Making Machines are easy to operate — an ordinary mechanic can quickly learn to do good work on them. If you are swamped with work — add an Oliver and save 50% to 60% of the labor over hand methods.

Send for details—no obligation
priced as low as $125.00

The Oliver line is complete, including ten types in four sizes for all classes of die work, and prices are within the range of every shop.

OLIVER INSTRUMENT CO.
1436 Maumee St., E. Adrian, Mich.

Production Show in Cleveland

(Continued from Page 41)

Hitchcock's Blue Book
Chicago, Illinois

Mall Tool Company
Chicago, Illinois

Master Chrome Service
Cleveland, Ohio

Modern Machine Shop
Cincinnati, Ohio

Onsrud Machine Co.
Chicago, Illinois

Master Tool Company
Cleveland, Ohio

Parker-Kalon Corporation
New York, New York

Porter-Cable Machine Co.
Syracuse, New York

A. Schrader's Son
Brooklyn, N. Y.

Smith Power Transmission Co.
Cleveland, Ohio

Sunnen Products Co.
St. Louis, Missouri

Tool·Die·Machine PROGRESS
Cleveland, Ohio

Wells Mfg. Co.
Three Rivers, Mich.

Weatherhead Co.
Cleveland, Ohio

Ford Motor Co.
Dearborn, Michigan

Jackson Machine & Tool Co.
Jackson, Michigan

V & O Press Co.
Hudson, New York

Replacing Dies Every Day

(Continued from Page 43)

The method of setting up insured absolute matching of upper and lower halves of the die, resulting, of course, in an accurate forging. Also, through using the duplicator, rather than other types of equipment it was found that better, stronger steel could be used, resulting in longer accurate life of the die.

When you order or write about products described in TDM PROGRESS please mention the publication.

Buy With Confidence

ABRASIVE PAPER AND CLOTH
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass. (Behr-Manning Div.)

ASSEMBLING MACHINES—Automatic
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

BARS—Rolled Composite
Forging and Casting Corp., Ferndale (Detroit), Michigan.

BENDING MACHINES—Special
McKinney Tool & Mfg. Co., The, 1688 Arabella Rd., Cleveland, Ohio.

BOLTS—Stripper
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

BORING MILL—Cutters
Bokum Tool Co., Inc., 49 W. Hancock St., Detroit, Mich.

BUSHINGS—Die
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

BUSHINGS—Drill Jig
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.

● This directory of products lists for ready reference the names of manufacturers and dealers whose sales to Tool·Die·Machine PROGRESS readers have established them as dependable in every sense of the word. They merit your consideration.

● Complete information about any product may be had upon request made to the firm listed or to us.

● Your mention of Tool·Die·Machine PROGRESS will be appreciated.

CAMS
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

CAM DEVELOPMENT
R. J. Schmidt Co., 227 Colonial Arcade, Cleveland, O.

CARBIDE ALLOY TOOLS and BLANKS
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.

CASTINGS—Air and Oil Hardening Tool Steel Cast to Shape
Forging and Casting Corp., The, Ferndale (Detroit), Mich.

CASTINGS— Nitri-Cast-Iron
Forging & Casting Corp., The, Ferndale (Detroit), Mich.

CHUCKS—Collet
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

CLAMPS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.

CLAMPS—Toggle
Danly Machine Specialties, Inc., 2121 S. 52nd St., Chicago, Ill.
Detroit Stamping Co., 5443 West Fort St., Detroit, Mich.
Knu-Vise, Incorporated, 6433 Cass Ave., Detroit, Michigan.

CONTOUR METAL-WORKING MACHINES
Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.

COUNTERBORES
Putnam Tool Co., 2985 Charlevoix Ave., Detroit, Mich.

Send for Valuable Booklet

Forgings For All Industries

Rough Turned or Finished Complete

●

Composite Die Sections
Extrusion Tools
Crankshaft Forgings
Gear Forgings
Die Casting Dies

●

Rings, Discs, Blocks, Shafts, Hubs, Bars, and Special Shapes.
Tool Steel of all Makes

S.A.E. Specifications

STAINLESS & COPPER FORGINGS

May We Serve You?

AJAX STEEL AND FORGE

205 ADAIR STREET DETROIT, MICHIGAN

When you order or write about products described in TDM PROGRESS please mention the publication.

CRANKSHAFTS—Heat Treated for Presses
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.
CUTTERS—Die-sinking
Geo. Gorton Machine Co., 1119—13th St., Racine, Wisc.
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
CUTTER GRINDER
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.
Oliver Instrument Company, 1436 Maumee St., E., Adrian, Michigan.
CUTTERS—Hard Carbide
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.
CUTTERS—Milling
Putnam Tool Co., 2985 Charlevoix, Detroit, Mich.
CYLINDERS—Hydraulic
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.
Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Mich.
CYLINDERS—Pneumatic
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.
Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Mich.
DIAMOND STONES
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.
DIAMOND WHEELS
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.
DIE CASTING MACHINES
Phoenix Machine Co., The, W. 28th and Church Sts., Cleveland, Ohio.
DIE CENTERS—Hard Carbide
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.
DIE FILING MACHINES
Illinois Tool Works, 2503 N. Keeler Ave., Chicago, Ill.
DIE HANDLING TRUCKS
Hamilton Tool Co., 222 North B St., Hamilton, Ohio
Lyon Iron Wks., 516 Madison Ave., Greene, N. Y.
DIE MAKERS SUPPLIES
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
DIE MAKING MACHINES
Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.
Foley Mfg. Co., 59 Main St., N. E., Minneapolis, Minn.
Grob Brothers, Grafton, Wis.
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Mich.
DIE SECTIONS—Composite Steel
Forging and Casting Corp., Ferndale (Detroit), Michigan.
DIE SECTIONS—Forged
Ajax Steel and Forge Co., 205 Adair St., Detroit, Mich.
DIE SETS
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
DIE SINKERS
Grobet File Corp. of America, 3 Park Place, New York City, N. Y.
DOWEL PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
DRESSING STICKS
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.
DRILLING MACHINES—Automatic
Sommer & Adams Co., The, 13511 Euclid Ave., Cleveland, Ohio.
DRILL JIG—Toggle Action
Knu-Vise, Incorporated, 6433 Cass Ave., Detroit, Michigan.
DRILL JIG BUSHINGS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
DRILL POINTERS
Oliver Instrument Co., 1436 E. Maumee St., Adrian, Mich.
DRILL PRESS—Vise and Adjustment Clamps
K-O Products Co., Benton Harbor, Mich.
DRIVE UNITS—Motorized
Drive-All Mfg. Co., 3402 Conner Ave., Detroit, Mich.
DUPLICATOR MACHINES
Geo. Gorton Machine Co., 1119 13th St., Racine, Wisc.
ELEVATING TABLES—Portable
Hamilton Tool Co., The, 222 North B Street, Hamilton, Ohio.
END MILLS
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
Putnam Tool Co., 2985 Charlevoix, Detroit, Mich.
EXTRACTOR—Broken Tap
The Walton Co., 48 Allyn St., Hartford, Conn.
FILES—Rotary
Hamilton Tool Co., The, 222 North B Street, Hamilton, Ohio.
Grobet File Co. of America, 3 Park Place, New York City, N. Y.
FILING MACHINES
Oliver Instrument Co., 1436 E. Maumee St., Adrian, Mich.
FILING MACHINES—Continuous
Continental Machine Specialties, Inc., 1303 Washington Ave., S., Minneapolis, Minn.
Grob Brothers, Grafton, Wis.
FORGINGS—General
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
FORGINGS—Water and Oil Hardening, High Speed, Special Alloy, Stainless and S. A. E. Steel
Forging and Casting Corp., Ferndale (Detroit), Michigan.
GAGES—Center, Depth, Planer, Telescoping, Surface, etc.
The Lufkin Rule Co., Saginaw, Mich
GAGES—Combination Height and Depth
Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.

Small Things to do that will Help you Avoid Headaches

Order that Next Lot of Jig Bushings from ACME

Because—

You can choose from a complete stock of both A. S. A. and Acme Standards.

They are easy to select from our catalog.

They arrive promptly and thus avoid delays in your shop.

Catalog on request.

ACME INDUSTRIAL COMPANY

206 N. Laflin St., Chicago, Ill. MONroe 4122

ACME

When you order or write about products described in TDM PROGRESS please mention the publication.

Style B

BOKUM Facing and Bottoming Tools

STYLE B permit machining bore and facing bottom in same operation. Also used for removing radius in bottom of blind holes.

BOKUM Plain Boring Tools

STYLE A scientifically formed cutting edges give guaranteed, consistent performance. Life equal to six normally-forged tools.

Bulletin, with prices, on Request

BOKUM TOOL CO., INC. 49 W. HANCOCK ST. DETROIT, MICH.

Style A

GAGES—Spring Stop
Knu-Vise, Incorporated, 6433 Cass Ave., Detroit, Michigan.
GAGE BLOCKS
Ford Motor Co., Johansson Div., Dearborn, Mich.
GEARS—Special—14 to 96 D.P.—Made to order only
Gear Specialties, Inc., 2640 W. Medill Ave., Chicago, Ill.
GRINDER—Cylindrical
Norton Company, Worcester, Mass.
GRINDER—Hydraulic Feed
Gallmeyer & Livingston Co., 304 Straight Ave., S.W., Grand Rapids, Mich.
GRINDER—Portable
Dumore Company, Racine, Wis.
GRINDER—Surface
Gallmeyer & Livingston Co., 304 Straight Ave., S.W., Grand Rapids, Mich.
Norton Company, Worcester, Mass.
Builders Iron Foundry, Providence, R. I.
GRINDER—Precision for Contours
Boyar-Schultz Corp., 2112 Walnut Street, Chicago, Ill.
Koestlin Tool & Die Corp., 3801 Humboldt Ave., Detroit, Mich.
GRINDER—Universal
Norton Company, Worcester, Mass.
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDER TOOL
Norton Company, Worcester, Mass.
GRINDING MACHINES—Cutter
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDING MACHINES—Drill
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDING MACHINES—Tap
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDING & LAPPING—Precision
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
GRINDING WHEELS
Carborundum Company, The, Niagara Falls, New York.
Norton Company, Worcester, Mass.
GUIDE PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
HAMMERS & MALLETS—Rawhide
Chicago Rawhide Mfg. Co., 1280 Elston Ave., Chicago, Ill.
HONING SERVICE
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.
INDICATORS
The Lufkin Rule Co., Saginaw, Mich.
INDICATORS—Dial
Federal Products Corp., Providence, R. I.
INDEXING DEVICES
Hartford Special Machy. Co., Hartford, Conn.
LAPS—Copper Head Expansion
Boyar-Schultz, Inc., 2112 Walnut Street, Chicago, Ill.
LAPPING COMPOUND
Carborundum Co., Niagara Falls, N. Y.
LAPPING MACHINES
Schraner & Co., A. P., 3333 Payne Ave., Cleveland, Ohio.
Norton Company, Worcester, Mass.
LEADER PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Die Supply Co., 1390 E. 80th St., Cleveland, Ohio.
MACHINE BASES—Fabricated
Die Supply Co., 1390 E. 80th St., Cleveland, Ohio.
MACHINE REBUILDING
Enterprise Machine Parts Corp., 2731 Jerome Avenue, Detroit, Mich.
MACHINE VISES
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

Complete Manufacturing Facilities

TOOLS, DIES JIGS, FIXTURES, GAUGES, JIG BORING
SPECIAL MACHINERY METAL SPECIALTIES DESIGN AND DEVELOPMENT

OVER 50,000 SQ. FT. FLOOR SPACE

PUNCH PRESSES
KINGSBURY DRILLING MACHINES
HIGH SPEED TAPPING MACHINES
MULTISLIDE

INJECTION MOULDING
SPRING WINDERS
HIGH SPEED BLANKING
SPOT WELDERS
CONVEYORS

Send prints or sample for prompt estimate

FEDERAL TOOL CORPORATION
400 North Leavitt Street - - - - Chicago, Illinois

When you order or write about products described in TDM PROGRESS please mention the publication.

MAGNETIC PARALLELS AND V BLOCKS
Geo. Scherr Co., Inc., 128-B Lafayette St., New York, N. Y.

MARKING DEVICES
New Method Steel Stamps, Inc., 149 Joseph Campau, Detroit, Mich.
H. O. Bates, 257-261 North Broad Street, Elizabeth, New Jersey.

MARKING PASTE
The Dyken Co., 2201 N. 11th St., St. Louis, Mo.

MICROMETERS
The Lufkin Rule Co., Saginaw, Mich.

MILLING MACHINES—Attachments
Lockwin & Company, 205 W. Wacker Dr., Chicago, Ill.

MILLING MACHINES—Vertical
Geo. Gorton Machine Co., 1119 13th St., Racine, Wisc.
Kearney & Trecker Corp. West Allis Station Milwaukee, Wisc.
Machinery Mfg. Co., Dept. 40, P. O. Box 155, Vernon Br., Los Angeles, Calif.
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

MILLING MACHINES—Continuous
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

NUMBERING DEVICES
H. O. Bates, 257-261 North Broad St., Elizabeth, N. J.

POLISHING & BUFFING MACHINES—Automatic Continuous
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

POLISHING GRAIN
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.

PRESSES—Arbor
Greenerd Arbor Press Co., 3 Reservoir St., Nashua, N. H.
Famco Machine Co., 1303 38th St., Racine, Wis.

PUMPS—Vacuum
Vacuum Systems, Inc., 1011 Power Ave., Cleveland, Ohio.

PUNCHES—Hand, Toggle Action
Kon-Vise, Incorporated, 6433 Cass Ave., Detroit, Michigan.

PUNCHES—Standard & Interchangeable
Hovis Screwlock Co., 3129 Larned St., E., Detroit, Mich.

RACKS—Bar Stocks
Wm. S. Yehe Supply Co., 507 Gibbs Ave., N. E., Canton, O.

REAMERS
Putnam Tool Co., 2985 Charlevoix Ave., Detroit, Mich.

REAMER—Self-centering Cylinder
Royal Oak Tool & Machine Co., 621 E. Fourth Street, Detroit, Mich.

REPAIR PARTS FOR MACHINERY
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.

RETAINERS—Punch & Die
Hovis Screwlock Co., 3129 Larned St., E., Detroit, Mich.

RIVETING MACHINES
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.

RIVETING MACHINES—Hydraulic
Tomkins-Johnson Company, The, 630 N. Mechanic St., Jackson, Mich.

ROLL FEEDS—Automatic
Wittek Mfg. Co., 4305 W. 24th Place, Chicago, Ill.

SAND BLASTING
Porter Steel Treating Co., The Geo. H., 1225 Marquette St., Cleveland, Ohio.

SAW & SHEAR CUT-OFF MACH.—Automatic
McKinney Tool & Mfg. Co., The, 1688 Arabella Rd., Cleveland, Ohio.

SAWING MACHINES—Continuous
Continental Machine Specialties, Inc., 1303 So. Washington St., Minneapolis, Minn.

SAWING MACHINES—Metal
Armstrong-Blum Mfg. Co., 5757 Bloomingdale Ave., Chicago, Ill.

SAWING MACHINES—Open End
Grob Brothers, Grafton, Wis.

SCREW MACHINE PRODUCTS—Contract
Star Machine & Tool Co., 9330 Woodland Ave., Cleveland, Ohio.
Ulmer Co., The J. C., 1791 East 38th St., Cleveland, Ohio.

SCREW MACHINE PRODUCTS—Hardened & Ground
Acme Industrial Co., 206 No. Laflin St., Chicago, Illinois.

SCREW DRIVERS—Power
Detroit Power Screwdriver Co., 5369 Rohns Ave., Detroit, Mich.

SCREWS—Socket Head
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
Strong, Carlisle & Hammond Co., 1392 West Third St., Cleveland, Ohio.

SCRIBERS
Ford Motor Co., Johansson Div., Dearborn, Mich.

SHAPER TOOLS—Carbide Tipped
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.

SHARPENING STONES
Carborundum Co., Niagara Falls, N. Y.
Norton Company (Behr-Manning Div.), Worcester, Mass.

SINE BARS
Ford Motor Co., Johansson Div., Dearborn, Mich.

SPACERS—For Milling Machine Arbors
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.

SPEED PULLEY DEVICES—Variable V-Belt
Speedmaster Co., 1482 Miner St., Desplaines, Ill.

SPRINGS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
Precision Spring Corp., 15400 Woodrow Wilson Ave., Detroit, Mich.

MAC-ITS Save on Production, Maintenance and Design!
Stronger, more accurate screws can end many tie-ups—save labor and replacements—and cut costs all along the line when your designs take advantage of their greater strength.
Mac-its give you all these savings in 16 standard items. For complete details, call your Mac-it distributor or write today for your copy of Catalog 38, listing the only complete line of heat-treated, alloy steel screws!
THE STRONG, CARLISLE & HAMMOND CO.
1392 West Third St., Cleveland · Ohio

ALLOY
HY-TEN
STEELS

Immediate Shipment from Seven Warehouses

ALLOY
S. A. E.
STEELS

Reduce your tool and die costs with *Hy-ten "M" Temper, .70 Carbon Cr-Ni-Moly* oil hardening alloy steel. Extreme toughness at high degrees of hardness. Rounds, squares and flats in stock. Forgings of all types.

Send for descriptive folder

CHICAGO **WHEELOCK, LOVEJOY & CO., INC.** DETROIT
CAMBRIDGE CLEVELAND NEWARK CINCINNATI BUFFALO

SQUARES—Combination, Try and Mitre
The Lufkin Rule Co., Saginaw, Mich.

STAMPINGS
Barth Stamping & Mach. Works, W. 34th & Denison, Cleveland, Ohio.
Davis Tool & Engineering Co., 6481 Epworth Blvd., Detroit, Mich.
Dayton-Rogers Manufacturing Company, 2821 13th St., S., Minneapolis, Minnesota.
Denning Mfg. Co., The, 1775-81 E. 87th St., Cleveland, Ohio.
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.
Federal Tool Corp., 412 N Leavitt St., Chicago, Ill.
Knu-Vise, Inc., 6433 Cass Ave., Detroit, Mich.
Modern Tool & Die Co., P. O. Box 2741, Cleveland, Ohio.
Star Machine & Tool Co., 9320 Woodland Ave., Cleveland, Ohio.
Star Tool & Die Works, 2522 24th St., Detroit, Mich.
Variety Machine & Stamping Co., The, 12695 Elmwood Ave., Cleveland, Ohio.

STAMPS—Steel
H. O. Bates, 257-261 North Broad St., Elizabeth, N. J.
New Method Steel Stamps, Inc., 149 Joseph Campau, Detroit, Mich.

STEEL—Alloy
Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West Fourth Street, Cleveland, Ohio.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.

STEEL—Carbon
Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West Fourth Street, Cleveland, Ohio.

STEEL—Chromium
Darwin & Milner, Inc., 1260-1264 West Fourth St., Cleveland, Ohio.

STEEL—"Cobalt"
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.

STEEL—High Speed
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
Columbia Tool Steel Co., 410 East 14th Street, Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.

STEEL—Stainless
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
STEEL—Tool & Die
Columbia Tool Steel Co., 410 E. 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.

Modern Tool and Die Facilities

Dies Jigs Fixtures Tools

SPECIAL GAGES

Profile, thickness, plug, etc. We also make and recondition gages with hard chrome. Our equipment includes projectors and comparators.

PRODUCTION WORK

Precision aircraft and machine parts

Experimental Work
Boring Mill, Jig Boring and Planer Work

DELIVERY TO MEET SPECIAL DEMANDS

Phone GArfield 2060

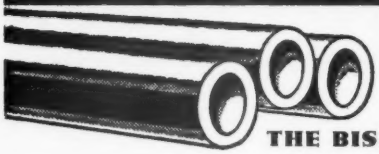
STAR MACHINE & TOOL COMPANY

9320 WOODLAND AVE. CLEVELAND, OHIO

Detroit Representative: J. O. Stephenson 2618 Fourth Ave., Detroit, Mich.

When you order or write about products described in TDM PROGRESS please mention the publication.

OIL HARDENING TOOL STEEL TUBING



Substantially reduces labor costs by eliminating the expensive procedure of drilling from the solid.

BISCO TOOL STEEL TUBING is a fine grade tool steel in tubular form available in sizes up to 14" diameter and 2" wall thickness; other sizes to your specification.

Tool Steels Alloy Steels Stainless Sheets and Bars

THE BISSETT STEEL COMPANY 947 E. 67th St., Cleveland, Ohio

STEEL PLATE—Ground
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

STEEL PLATE—Rough or Machined Torch Cut Shapes
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

STEEL TREATING—Hardening
Porter Steel Treating Co., The Geo. H., 1225 Marquette St., Cleveland, Ohio.
Sal-way Steel Treating Inc., 624 W. Elizabeth St., Detroit, Mich.

TAP EXTRACTOR
The Walton Co., 88 Allyn St., Hartford, Conn.

TAPPER—Precision
The Viking Tool & Machine Corp., 6 Main St., Belleville, N. J.

TESTING MACHINE—Hardness
Wilson Mechanical Inst. Co., Inc., 387 Concord Ave., N. Y. C., N. Y.

TOOLS AND DIES—Carbolay
Kiffer Tool & Die Co., 5601 Tillman Ave., Cleveland, Ohio.

TOOLS—Carbide Tipped
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.

TOOL CHESTS
Gerstner Tool Chests, 56 Columbia St., Dayton, Ohio.

TUBING—Tool Steel
Bissett Steel Co., The, 947 E. 67th St., Cleveland, Ohio.

TYPE HOLDER
H. O. Bates, 257-261 North Broad St., Elizabeth, N. J.
New Methods Steel Stamps, Inc., 149 Joseph Campau, Detroit, Mich.

VALVES—Operating
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.
Ross Operating Valve Co., 6478 Epworth Blvd., Detroit, Mich.

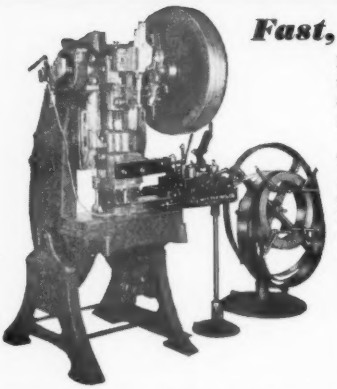
WASHERS—Special
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.
H. K. Metal Craft Corp., 387 Second Ave., New York, N. Y.

WELDING
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Star Tool & Die Works, 2522 24th St., Detroit, Mich.

WELDING PLIERS
Knu-Vise, Incorporated, 6433 Cass Ave., Detroit, Michigan.

WELDING RODS
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.

WITTEK ROLL FEEDS
FOR ANY MAKE AND SIZE OF PUNCH PRESS



Fast, Safe, Accurate, Automatic

Maintain production schedules, yet keep costs down, by installing Wittek Roll Feeds—the feeds that have made automatic punch press operation practical on even comparatively short runs.

IMPROVED OPERATING PRINCIPLE

The improved and simplified method of operation of **Wittek Automatic Roll Feeds** eliminates complicated moving parts and insures rapid, smooth and accurate feeding. Single Roll, Double Roll (Push-Pull) and Compound Types, with or without straighteners. **Wittek Roll Feeds** save dies, reduce scrap and cut maintenance costs.

Wittek Roll Feeds can be installed on **any** make or size punch press without alterations, will handle **any** type coiled stock and will feed in **any** of four directions—right to left, left to right, back to front or front to back in any length from 0" to 24" per press stroke at catalog speed or faster.

Write for Free Catalog

Wittek Manufacturing Co.
4305 W. 24th Pl. Chicago, U.S.A.

WITTEK ADJUSTABLE Reel Stands

6 types — a type for every job. Will handle any stock (metal, foil, paper, etc.). **Wittek No. 3** (illustrated) has automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back-lash of stock.

Lester-Phoenix Offers New Die Casting Machines

THE Lester Engineering Company and The Phoenix Machine Company, both of Cleveland, announce two new die casting machines, the HHP-2A and the HHP-3, for zinc, tin and lead alloys. Similar in design, they produce castings up to twelve pounds and nineteen pounds of zinc, respectively. Quickly changing the pot and injection plunger adapts them to aluminum, brass, and magnesium alloys. The mechanical features are radical departures, new to the die casting art, but long since amply proven in the field of injection plastics.

Just how good an impression a new Lester-Phoenix die casting machine made with one experienced caster is shown by an order for a second machine only two weeks after the first.

Solid beams replace tie bars, making for rigidity. Mold adjustment is through a worm-and-screw. These two features keep mold platens always in a parallel position and assure positive alignment.

Positive mold-locking up to 800,000 pounds is attained with the link-and-link lock toggle system. Strain is removed from the pins and taken up by extremely heavy end plates through the toggle links. Mold opening and closing movements are adequately cushioned.

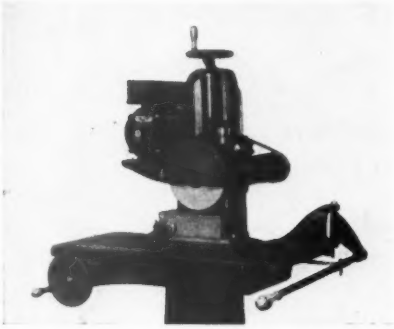
The speed of the injection plunger and pressure on the metal are controllable. Sequence of operation is electrically controlled, as is the timing of each operation.

A sensational advance consists in the replacing of the conventional accumulator bottle by a hydraulic system which develops a tremendous pressure and maintains it throughout the operating cycle. The pressure upon the metal increases as resistance grows. This uniformity of pressure leads to uniform density, or homogeneity, in the resultant casting.

Safety is uppermost. A limit switch is so arranged that the injection plunger cannot function unless the die is closed and locked. Moreover, the operating lever is so designed that any operation may be immediately reversed by a slight push.

The pot is supported on a ring inde-

(Continued on Page 52)



Now — a surface grinder just for your small tool and die work—

The Builders "T" Surface Grinder—the product of a Company with over 40 years' experience in the manufacture of grinding machines — embodies the best conventional features, as well as new elements of design which offer greater convenience and accuracy.

SMALL WORK CAN BE DONE CHEAPER

on this machine than on large automatics which not only require greater set-up time but, due to overtravel and less flexibility, longer grinding time, too.

MACHINES ARE MODERATELY PRICED

so that it pays to install them at points convenient to the men who frequently have small grinding to do.

For Bulletin N644, address—

BUILDERS . PROVIDENCE
IRON FOUNDRY RHODE ISLAND

When you order or write about products described in TDM PROGRESS please mention the publication.

Builders of
Machines,
Dies, Jigs, Fixtures
Tools and Gages

Manufacturers of
Precision Parts and
Complete Products
to order

General Machine Work

We invite you to check
our facilities,
our equipment,
workmanship
and experience.

THE BUNELL MACHINE & TOOL COMPANY

Telephone: PRospect 2681

1620 East 24th St. Cleveland, O.

New Lester-Phoenix Die Casting Machines

(Continued from Page 51)

pendently of the furnace, so that nozzle adjustment is easily made through a rack-and-pinion movement. The goose-neck and cylinder are very accessible. Adjustments or replacements can be accomplished with little loss of time. The change from the zinc to the aluminum pot is simple and rapid.

The entire equipment is constructed of the best metals available. It is massive and sturdy, weighing 11,000 pounds in the HHP-2A size and 19,000 pounds in the HHP-3.

For complete information on the new Lester-Phoenix Die Casting Machines, write the Phoenix Machine Company, 2711 Church Ave., Cleveland, Ohio.

Portable Power Tools

(Continued from Page 29)

and die work. One such stand has two holders for the grinder motor; one in the over-arm and one under the auxiliary table which can be tilted to any angle up to 45°.

Fig. 2 shows the Tool Room Grinder being used to recess and mill a brass templet.

A Contour Grinder is ideal for finishing dies, gages, templets, work of special shapes, "finding blanks" and in trimming operations on non-ferrous metals. It does away with arduous hand filing and hand stoning. A ⅜ HP motor, capable of 18,000 R.P.M., is fast for smooth work. The work table surface is of ample size for most small pieces. The motor holder can be tilted from 90° to 45°—giving a range of angles for most work. The chuck takes mounted points and with an arbor it will take wheels up to 1½" diameter for a variety of grinding operations. The motor can be readily removed from the table and used as a tool post grinder.

Fig. 3 shows a brass templet being outlined accurately with a Contour Grinder.

When considering portable Electric Tools of one form or another for the tool and die rooms, it must be remembered that accessories that can now be secured increase greatly the number of uses which can be made of the equipment.

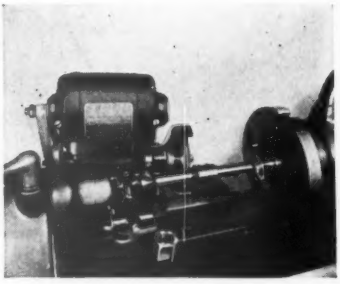
When you order or write about products described in TDM PROGRESS please mention the publication.

New Dumore Thread Grinder Attachment Cuts Finishing Costs on Boring Tool

THE Dumore Thread Grinder Attachment for the No. 5 Grinder saved time and money for a midwest tool shop in the production of this high-speed boring tool.

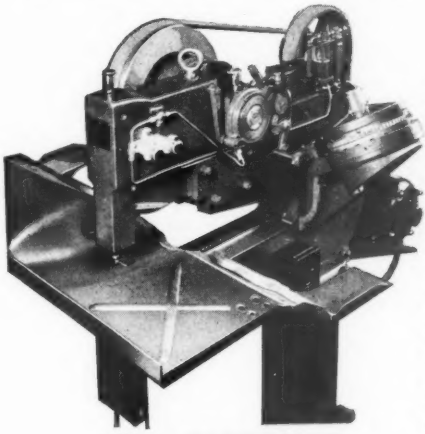
When the tool steel shaft was hardened and drawn, it was found that the distortion due to hardening made it impossible to screw on the boring piece which required a precision fit. However, the shaft thread was quickly and easily re-ground with the Dumore Thread Grinder Attachment, thus saving the 6 hours work required to machine a new tool, at a total saving of approximately $15.00.

Here was a job for which the thread grinder attachment was ideally suited, for machining this small piece did not warrant the large expenditure which would be entailed if a large thread grinder was set up to do the job. Costly delays which result from sending the work out of the plant were completely avoided. Instead, the No. 5 Dumore grinder was quickly converted into a thread grinder to handle the job.



A leaflet, "Instructions for Dumore Thread Grinder," giving complete set up and operating information on their attachment will be sent on request. Write the Dumore Company, 370-F, Racine, Wis.

increases production from 3 to 5 times



The CLINCHOR

24" throat setting clinch nuts in automobile floor panel

definitely

minimizes spoilage

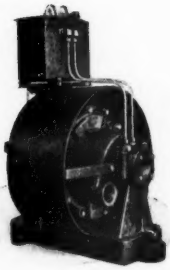
a clinch nut is set and the next nut fed to position at the trip of a foot pedal and at the rate of 190 strokes per minute. Approach to this maximum is determined by the ease with which the work can be handled.

Send samples of your work (and a few clinch nuts, too, please) for specimen settings. They will be set and returned promptly for your inspection. If your work is too large to be sent conveniently, write for samples of a certain type of clinch nut setting or write for descriptive bulletins C-2 and BC-1 to The Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Michigan.

this is a **TOMKINS-JOHNSON** *product*

When you order or write about products described in TDM PROGRESS please mention the publication.

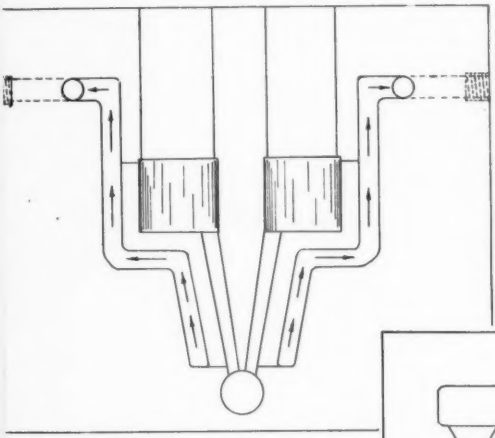
Roto-Piston Pump Emphasizes Advantages of Vacuum for Plastic Molding and Die Casting

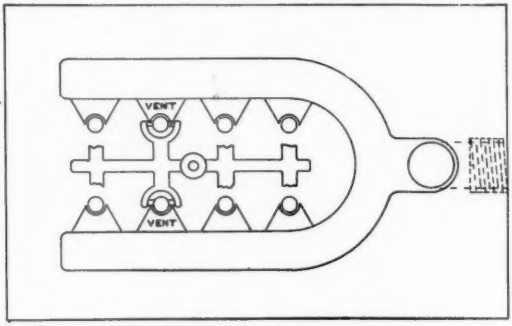


VACUUM pumps of two general designs, rotary and reciprocating piston, have been developed and are in general use. The advantages of one—the rotary type—compactness, simplicity and economy, have for the most part been competitive with the advantages of the other or reciprocating piston type—high vacuum and reliable performance over a greater range of operating requirements.

The "Crescent" Roto-Piston Dry Vacuum Pump, of entirely different design than any other vacuum pump on the market, is said to retain all advantages of rotary construction and have the operating characteristics of the reciprocating piston type. This pump has a rotating assemblage, the exterior case rotates in unison with the interior rotor, turning in the same direction at the same angular velocity and uses air as a cooling agent, thus maintaining a constant load in perfect balance.

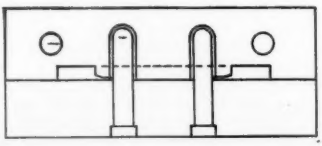
The rotor turns with the case, but on an eccentric slightly aside from the common center of the case, the rotor holding a constant rolling motion contact with the case by a seal ring carried in the rotor side. A vane recessed in the rotor and slotted through the periphery wall maintains a flat, constant seal against the inner wall of the case. This vane separates the intake from the exhaust chamber. Air enters through the hollow fixed shaft, passes through the interior of the rotor and, as the case and the rotor revolve clockwise, a charge of air is sucked into the crescent chamber back of the vane which is always





Above, proper venting is essential in vacuum die casting. The general scheme for venting a dual die casting die for aluminum piston bodies is shown. Porosity is eliminated, tensile strength is increased.

Right, a multiple injection mold for fountain pen caps. The vents remove any trapped air, preventing blistering or discoloration.



Roto-Piston Pump

(Continued from Page 54)

sealed. As the revolution continues the crescent chamber continually decreases, pushing air out through the exhaust port.

At the point of contact of the vane and the case the vane travels one inch and a quarter forward travel and reverses to the point of beginning with each full revolution of the case, the sharp squared end of the vane contacts a flat surface of the case of 1¼", the vane's full travel.

Because the case and rotor revolve in the same direction and at the same angle of velocity, a right angle seal is maintained at all times and a cycle of operation is accomplished by ½ of the stroke or complete case revolution.

The "Crescent" Pump, fully protected by basic patents, has been made for over 15 years and is in successful operation in a wide variety of industries. In the metal working field it has enjoyed particular favor in the plastic molding and die casting industries.

The pump uses a positive mechanical seal, the rotating case is air cooled. The manufacturer guarantees a constant vacuum to within a half-inch of the barometer and a 99% volumetric efficiency.

Write to Vacuum Systems, Inc., 1011 Power Ave., Cleveland, Ohio, for "Crescent" Roto-Piston Dry Vacuum Pump, Bulletin No. 7.

Grobet Adds Countersinks to Rotary File Line

THE Grobet File Corp. of America, agents for the celebrated Grobet Swiss Files, has recently added to its line of Rotary Files a complete selection of Chatterless Countersinks, diameters ¼" to 1", angles 30° and 41°.

Made of high speed steel, these tools have teeth so designed as to make chatter almost impossible. This feature permits heavy cuts and produces a very smooth surface.

Grobet Countersinks are illustrated in catalog YC, which also shows hundreds of rotary files hand cut, milled cut and ground from the solid; diesinkers, burs, etc.

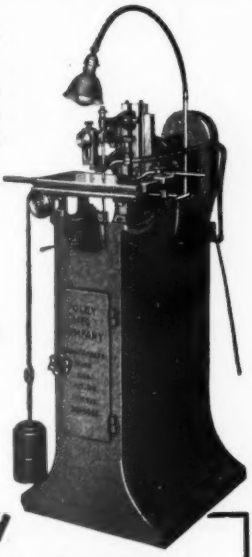
For your copy of catalog YC, write the Grobet File Corp. of America, 3 Park Place, New York City, N. Y.

The ONLY Machine using

HIGH SPEED

BLADES

for High Carbon High Chrome Steel—up to 3 Inches Thick



USES ANY STANDARD FILE

FOLEY

DIE-MAKING MACHINE

Handles most intricate dies with small holes and sharp corners, as only smallest lead hole through which saw or file can pass is necessary. Compound angle filing is fast, accurate and easy with the **Foley Die-Making Machine.** Adjustable table tilts 20° front, 10° back. Ram tilts 20° right or left. Has 6¾" throat—saws to center of 12¾" piece.

STANDARD OR SPECIAL FILES—From the smallest needle file to the coarsest bastard file can be used in this machine without any special holding fixtures.

TAKES ANY SAW—Any type of saw from the finest saw to the high power high speed saw can be used without delay of changing holding fixtures. No holes in blade necessary.

30-DAY TRIAL OFFER

The **Foley Die-Making Machine usually pays for itself in 400 working hours.** Use it for 30 days in your own plant on our Free Trial Offer. Write today for literature and full details.

FOLEY MFG. CO.

59 Main St., N. E., Minneapolis, Minn.

Manufacturers of Foley Automatic Saw Filers, Grinders, Setters, etc.

When you order or write about products described in TDM PROGRESS please mention the publication.

Die Designing and Estimating

(Continued from Page 26)

PERFORATORS, PILOTS AND THEIR CORRESPONDING HOLES	
Column E — see Table and Drawings Figs. 2-21-26	
PERFORATORS — 2 required, type 2 (.7 each) (Fig. 22) ..	1.4
PILOTS — 4 required, type 2, (.7 each)	2.8
PERFORATOR AND PILOT HOLES— (.9 each, 6 holes, Fig. 23) ..	5.4
FINGER STOP—(Fig. 25) ..	3.0
PILOT BUSHINGS—(Type 2 Perforator)	2.0
TOTAL Column E	14.6 hrs.
ASSEMBLY, TRYOUT, DEVELOPMENT	
Column F—see Table, Fig. 28 and accompanying text	
DIE—Det. 1—including STRIPPER (Fig. 28)	1.5
DIE—Det. 20—including STRIPPER (Fig. 28)	1.5
PUNCHES — Det. 8 — 1 hr. each, 2 required	2.0
PUNCHES — Det. 3 — 1 hr. each, 2 required	2.0
PUNCHES — Det. 7 — 1 hr. each, 2 required	2.0
PERFORATORS—2 required..	1.0
PILOTS—4 required	2.0
INSERTS—6 required	3.0
PUNCH PLATE	4.0
BUMPER	.5
TRYOUT	10.0
DEVELOPMENT OF EMBOSS—2 req., 5 hrs. each .. (Page 31 in Book)	10.0
TOTAL Column F	39.5 hrs.
Estimated hours of labor required	209.5 hrs.

Glossary of Plastic Mold Designing

(Continued from Page 22)

and which must be withdrawn before the part is ejected.

SPACER—parallel support bars (CRS, in standard widths). See "parallels".

SPLIT RING MOLD—a mold in which a split cavity block is assembled in a chase to form undercuts in a molded piece. These parts are ejected from the mold and then separated from the piece". (See "chase", "loose pieces", "side bars").

SPRUE—entrance or feed hole in an injection mold. Or the slug formed at this hole ("spur" is a shop term for the sprue slug).

UNDERCUT—that part of a casting that is greater in area than the mouth or top opening area of the mold.

VERTICAL FLASH RING—clearance between force and vertical wall, designed to prevent scoring. The ring of excess material which escapes from the cavity into this clearance is also called the vertical flash ring.

Lufkin Rule Adds New No. 80 Series Inside Micrometers

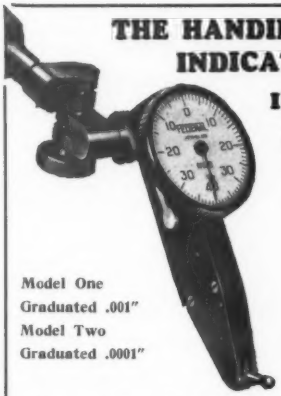
THE Lufkin Rule Co. has just added the new No. 80 Series Inside Micrometers to their well-known line of precision tools. Designed for the mechanic who does not require the distinctive features offered only in the Lufkin No. 680 Inside Micrometers, this new and popular priced micrometer also has a great many uses.

Measurement of internal diameters, slots, rings, parallel surfaces, checking and setting calipers, comparing of gages etc., are just a few of the applications the shopman can make with this new and improved tool. Great care has been taken to insure long life and extreme accuracy plus clear and distinct graduations. All contact points are hardened and ground and each extension rod and collar is marked for the range required. On the extension rods the contact points also are adjustable so that their individual length is maintained.

When necessary, a handle can be attached to the head, allowing the shopman to take accurate sizes of the smaller diameters. In offering the new No. 80 Series Inside Micrometers, The Lufkin Rule Co. has again placed an item in the hands of the workman which insures him ease in operation and satisfactory accuracy.

For literature or a demonstration of the No. 80 Series Inside Micrometers, phone your local Lufkin man or write The Lufkin Rule Co., Saginaw, Mich.

Have you read the Glossary of Plastic Mold Designing? See Page 20.



THE HANDIEST INDICATOR IN THE SHOP

Model One
Graduated .001"
Model Two
Graduated .0001"

You can use it anywhere in any position. Point motion reversible, and swivels to any position. Dial rotates for setting zero. Universal clamp holds it in any position. Write for folder.

FEDERAL PRODUCTS CORPORATION
PROVIDENCE, R. I.

FEDERAL

PRECISION MEASURING INSTRUMENTS

"T" SLOT

NUT SETS

Gorton SAFE-T-SLOT Nut Sets provide faster set-ups . . . protection for accurately finished jobs . . . savings (inexpensive studs are only replacements) . . . safeguards precision machine tables. *Write for Catalog No. 1317-B.*

George Gorton Machine Co.
1119-13th Street
RACINE WISCONSIN

When you order or write about products described in TDM PROGRESS please mention the publication.

Tool · Die · Machine CONTRACT SHOPS

Modern facilities for every type of designing and building service. Die Shop, Tool Room, Stamping, Assembly and Production work. All will appreciate inquiries for types of work indicated.

Chicago, Illinois

***FEDERAL TOOL CORPORATION**
412 North Leavitt St. HAYmarket 2150
Tools Dies Jigs Fixtures
Stampings Special Machinery

Design of Production Dies—Tools
Consulting and design service on high production progressive and compound dies, also production tools and special machinery. Inventions commercialized.
Quotations on design or tool costs for stampings furnished on request.
E. V. TAYLOR, Mechanical Engineer
111 W. Washington St., Chicago, Ill.

Detroit, Michigan

DAVIS TOOL & ENGINEERING COMPANY
6481 Epworth Blvd. TYler 46070
TOOLS and DIES
Special Machinery
Sheet Metal
Stampings and Assemblies

***ENTERPRISE MACHINE PARTS CORP.**
Jerome Ave. at McNichols Rd. E. TOwnsend 8-9643
PRODUCTION MACHINE REPAIR PARTS
Motor Drives, Gears, Worms, Tools, Fixtures
Machine Overhaul Specialists

***KOESTLIN TOOL & DIE CORPORATION**
3605 Humboldt Ave. Detroit, Mich.
Manufacturers
Sheet Metal Dies "Grindrite" Die Grinders

LINCOLN TOOL & DIE COMPANY
950 West Fort Street CHerry 0733
TOOLS—DIES—JIGS—FIXTURES
Special Machinery *Precision Grinding*

MAJESTIC TOOL & MFG. COMPANY
2948 Woodbridge St., East Fltzroy 1011
Manufacturers
General line of Tool and Die Work, Tool Details, Parker High Speed Grinding Spindles

NORTHEASTERN ENGINEERING CO.
3125 E. Larned St. Fltzroy 1275
Specialists in the Designing and Building of Progressive Dies
Dies—Tools—Special Machinery

*See larger display advertisement also.

ROBBINS ENGINEERING COMPANY
637 Mt. Elliott Ave. Fitzroy 4740
Designers and Manufacturers
Tools, Dies, Jigs, Fixtures
Special Machinery and Experimental Work

ROYAL OAK TOOL & MACHINE CO.
621 E. Fourth St.. Royal Oak, Mich. ELmhurst 6580
Manufacturers of
Tools, Dies, Jigs, Fixtures. Special Machinery and Designing. Hoch Self-Centering Cylinder Reamers

STAR TOOL & DIE WORKS
2522-24th St. LAfayette 1716
BUILDERS of DIES
Facilities for the Largest
MANUFACTURERS
of STAMPINGS

New York City, N. Y.

THE S & R FOLDING MACHINE COMPANY, INC.
841 E. 134th St. Melrose 5-7830
Economical Machine Work Done.
Let us quote on producing machine parts for you. We are equipped to do GENERAL MACHINE WORK *of all types.*

Cleveland, Ohio

BARTH STAMPING & MACH. WORKS
W. 34 & DENISON FL. 8411
DIES—TOOLS—JIGS—MOLDS
GLENN A. BARTH THOM. A. BARTH
J. A. BARTH J. J. BARTH

***THE BUNELL MACHINE & TOOL CO.**
1620 East 24th St. PRospect 2681
DIES—JIGS—FIXTURES
Gages—Models
SPECIAL MACHINERY
Swiss Jig Boring
Screw Machine Products

When you order or write about products described in TDM PROGRESS please mention the publication.

CLEVELAND UNIVERSAL JIG COMPANY
13404 St. Clair Ave. MUlberry 3322
Designers and Builders
Jigs & Fixtures Special Machines
Production Engineering
COMPLETE PLANT ROUTING and TOOLING

THE DENNING MANUFACTURING COMPANY
1775-81 East 87th St. CEdar 0801
Designers and Builders
HIGH GRADE DIES

GENERAL DIE & TOOL COMPANY
2067 W. 55th St. WOodbine 4736
Dies Tools Jigs Fixtures
Light Stampings Manufacturing Special Machinery

HAHN MANUFACTURING COMPANY
5332 Hamilton Ave. ENdicott 2205
Modern equipped shop for building of
MEDIUM AND LARGE
DIES, TOOLS, SPECIAL MACHINERY
Equipment includes:
3" and 5" spindle Horizontal Boring Mills
Large planers Vertical Mill

THE INDUSTRIAL MACHINE CO.
1436 East 47th Street Founded in 1903
Builders of Special Machinery
GENERAL MACHINE WORK

KIFFER TOOL & DIE CO.
5601 Tillman Ave. WOodbine 2440-2441
Manufacturers Special Machinery
Tools, Dies, Jigs, Fixtures, Tungsten Carbide Tools
SWISS JIG BORING

THE McKINNEY TOOL & MFG. CO.
1688 Arabella Rd. KEnmore 1681
Roller Die Forming Machines
Automatic Saw and Shear Cut-off Machines
Special Machinery—Dies, Jigs, and Fixtures
Jig Boring—Precision Machine Parts

OHIO TOOL COMPANY
3160 West 106th St. CLearwater 3200
Designers and Builders
SHEET METAL DIES, TOOLS, SPECIAL MACHINERY, DIE CASTING DIES
RUBBER MOULDS
●
Modern Facilities
150-Man Shop

*See larger display advertisement also.

MODERN TOOL & DIE CO.
P. O. Box 2741
West Park Branch CLearwater 6410
DESIGNERS AND BUILDERS
Tools and Dies *Special Machinery*
STAMPINGS

THE PARAMOUNT TOOL CO.
1392-98 East 43rd St. ENdicott 2220
JIGS, FIXTURES, DIES
Experimental Work

*The PHOENIX MACHINE COMPANY
2711 Church Ave. CHerry 1048
PLANERS
42" by 14 ft. long
24" by 6 ft. long
Let us figure

A. P. SCHRANER & COMPANY
3338 Payne Ave. HEnderson 8644
EXTERNAL CYLINDRICAL LAPPING MACHINES
Special Machinery
TOOLS, DIES, JIGS, FIXTURES

*THE SOMMER & ADAMS CO.
18511 Euclid Ave. KEnmore 0810-0811
DESIGNERS AND BUILDERS
Special Machinery
TOOLS, JIGS and FIXTURES

*STAR MACHINE & TOOL COMPANY
9320 Woodland Ave. GArfield 2060
Designers and Builders
Dies, Jigs, Fixtures, Gages, Special Machinery
Jig Boring—Planer Equipment

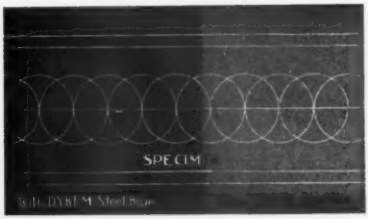
TOOLS & GAGES, Inc.
3106 East 63rd St. MIchigan 7230
"Let us be your tool room."
DESIGNERS AND BUILDERS
Tools, Gages, Dies, Jigs, Fixtures
Special Machinery
SWISS JIG BORING
DIE CASTING DIES

THE VARIETY MACHINE & STAMPING COMPANY
12695 Elmwood Ave. LAkewood 8433
Designers and Manufacturers
Dies, Metal Stampings 250 tons capacity

Hamilton, Ohio

*THE HAMILTON TOOL COMPANY
220-222 North B Street
Designers and Builders of
Tools, Dies, Jigs, Fixtures, Special Machinery
The Hamilton Portable Elevating Table

When you order or write about products described in TDM PROGRESS please mention the publication.



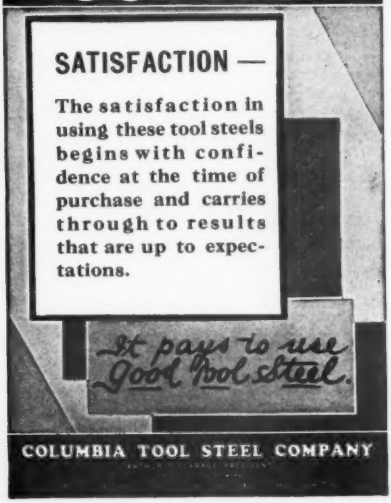
DYKEM STEEL BLUE
STOPS LOSSES
making dies & templates

Simply brush on; ready for the layout in a few minutes. The dark blue background makes the layout lines show up in a sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY
2201 N. 11th STREET ST. LOUIS, MO.

Columbia TOOL STEEL


SATISFACTION —
The satisfaction in using these tool steels begins with confidence at the time of purchase and carries through to results that are up to expectations.
It pays to use Good Tool Steel.
COLUMBIA TOOL STEEL COMPANY

Detroit Stamping Company To Build New Plant

THE Detroit Stamping Company announces that a contract has been let for a new plant. The company outgrowing the leased buildings which it has occupied for more than 25 years will have a new one-story building of 35,000 square feet on a two-acre plot. A modern structure of steel, glass and concrete will be detailed in keeping with production-line studies, all raw materials will be received at the rear of the structure under a crane and will move continuously from single or multiple press or assembly operations through inspection to shipping department at truck level loading in the front of the building. A large balcony, over the die storage department, will be used for manufacture of small, light stampings or assemblies.

Present late type design equipment of the company, including many automatic presses, will be moved to the new plant, and augmented by additional equipment of newest design and high service value. It is anticipated by officers of the company that both new building and new equipment will not only result in increased production of highest quality stampings, but that it will also result in economy and an evident lowering in production costs. Modern handling equipment will improve service and effect prompt deliveries.

The range of stampings includes production from any required metal, parts from the simplest to most complicated design and from smaller than a dime in size up to 46″ long, 3″ draw and ⅜″ metal thickness. This company also produces special washers, shims and arbor spacers of various metals and of close tolerance, toggle clamps, blower-fan housings, and other De-Sta-Co products.

Monarch Machine Tool Announces Sixth Addition in Six Years

WENDELL E. WHIPP, president of Monarch Machine Tool Co., announces a 20,000 square foot addition to the plant. This will increase the present capacity approximately 15 per cent.

"The building extension has been found necessary to house approximately $200,000 of new production equipment

(Continued on Page 61)

When you order or write about products described in TDM PROGRESS please mention the publication.

DOWEL PINS

We maintain an unusually large stock of Dowel Pins—including many sizes not ordinarily carried.

When you need Dowel Pins, try Die Supply first.

Prompt and dependable delivery.

Ask for Accessories Catalog

DIE SUPPLY COMPANY

1390 E. 30th St. Cleveland, O.

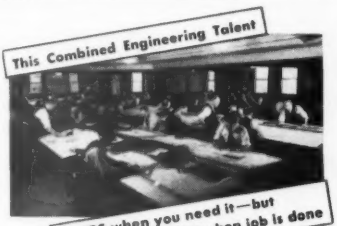
Sixth Monarch Addition

(Continued from Page 60)

ordered since the first of the year," Mr. Whipp said.

"This equipment was purchased to handle the mounting volume of orders which, even in view of the new plant addition, constitutes a backlog that bids fair to insure capacity production for the rest of 1940."

Work on the new building, the sixth expansion to the Monarch plant in six years, is to start immediately.



Keep your payroll down to a minimum. Employ this group only as required: (1) to relieve you of work when temporary rush taxes your facilities; (2) to help you reorganize your production methods to avoid the necessity of plant or equipment expansion; (3) to help you with new product development; (4) to consult with you on all manufacturing problems with a view of achieving greater economies.

PIONEER ENGINEERING

AND MANUFACTURING CO.

33 MELBOURNE AVE. DETROIT MICH.

30 DAY FREE TRIAL OFFER

Speed Your

PRODUCTION

with

WALTON TAP EXTRACTORS

Walton alloy steel "fingers", which fit the flutes of the tap, grip and back out the broken piece quickly, easily and without damage to threads.

World-wide acceptance for 30 years proves the value of Walton Tap Extractors.

Stock sizes from No. 4 machine screws to 1½". in 2, 3 or 4-flute types.

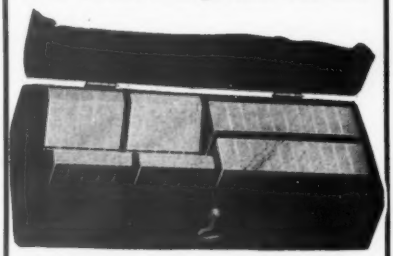
Write for Circular 131. Select your sizes and put them to work at our risk.

THE WALTON CO.

88 Allyn Street Hartford, Conn.

MAGNE-BLOX

For Your Magnetic Chuck



MAGNE-BLOX are essential for irregular surface grinding jobs that cannot be held directly on the plane surface of the magnetic chuck. Small set shown consists of 2 laminated parallels 1" x 1¾" x 3¾" and 2 magnetic V Blocks 1¾" x 1¾".

INTRODUCTORY PRICE.....$12.50 complete

CHEAPER THAN MAKING YOUR OWN. TESTS PROVE MAGNE-BLOX HAVE GREATER HOLDING POWER THAN HOME-MADE DEVICES.

Order by mail. MAGNE-BLOX are required in all tool and die shops. Sent anywhere on 10 days trial, subject to your approval. Larger sizes and exclusive MAGNETIC ANGLE IRON shown in Folder No. 138. Ask for it.

GEO. SCHERR CO. 128-B Lafayette St. New York, N. Y.

INCORPORATED

When you order or write about products described in TDM PROGRESS please mention the publication.

H. O. BATES
TOUGH

STEEL LETTERS & FIGURES, NUMBERING MACHINES, MARKING MACHINES, STAMPS & DIES

. . .

MARKING PROBLEMS INVITED

. . .

SEND FOR LATEST CATALOG

H. O. BATES, MARKING DEVICES
251-257 North Broad Street
ELIZABETH, N. J.

"Grinding and Finishing with Portable Equipment"

AN attractive Norton Booklet of this name gives detailed recommendations for grinding wheels to be used with standard portable grinding machines in many classes of work. The principal fields served and classes of work done are given along with specific grain and grade recommendations for portable grinding in all types of foundries, mills and shops. A section on the tool room and die shop gives specifications of straight wheels for internal, off-hand and general purpose grinding and surfacing. Other sections on grinding and finishing welds, polishing or finishing welds are also of interest to tool and die shops. The booklet is well illustrated with typical grinding, polishing, finishing jobs shown in process.

For a copy of "Grinding and Finishing with Portable Equipment", write Norton Company, Worcester, Mass.

VALUE

True value shows up under actual test. Ask men who use Gerstner Chests how they like them.

Tool Chest Makers for over 30 years

GERSTNER TOOL CHESTS
56 Columbia St. Dayton, Ohio

"Keep in step with PROGRESS"

"AVIATION"

RAPID ACTION TOGGLE CLAMPS Model "C"

KNU-SINE

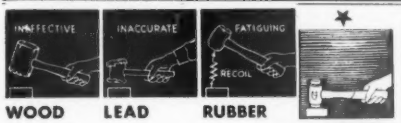
Illustration shows two Model CPM Toggle Clamps used to hold drop forgings in milling machine—one of the many applications shown in our new Catalog No. 4. Write for your copy today.

KNU-VISE, INC.
6433 CASS AVE. DETROIT, MICH.
Coast stock—1178 Heliotrope Drive, Los Angeles, Cal.—Phone OL 3662

For Perfect Die Castings and Molded Plastics, there's nothing like
The CRESCENT "ROTO-PISTON" DRY VACUUM PUMP

Used on plastic molds the "Roto-Piston" eliminates blisters and burns, speeds production by holding temperature down and ejecting parts easily.
Used on die castings "Roto-Piston" eliminates porosity, increases tensile strength and reduces rejects to the vanishing point. It saves both toolmakers' and operators' time.
With a record of fifteen years of successful operation in a wide variety of applications, the "Roto-Piston" may be direct-connected, or belt driven, is air cooled and a positive seal pump. Operating to within half an inch of barometer (or better), and 99% volumetric efficiency.
"If you have a vacuum problem, solve it efficiently and economically with 'Roto-Piston' Pump."
Tell us your problem and we will tell you what we can do for you.

VACUUM SYSTEMS, INC.
1011 POWER AVE.
CLEVELAND, OHIO



WOOD LEAD RUBBER RAWHIDE

WOOD
makes a clumsy tool that will split and crack.

METAL
has edges that turn, break and fly off.

RUBBER
makes a bouncing head that chips and smears.

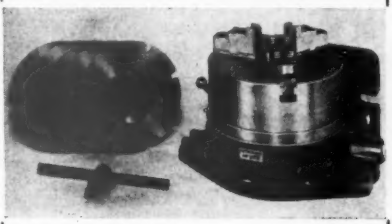
RAWHIDE
heads and faces stay accurate, absorb shock and wear longest.

• Chicago Rawhide Hammers and Mallets are the tools for striking hard accurate blows safely on any surface that must not be cracked, battered or marred. The tough Java Water Buffalo hide, coiled, compressed and treated for long life will not split, break or even dent, and has resilience to absorb rebound for easier, accurate blows

• This hammer and mallet with genuine rawhide heads are quality tools for thrifty mechanics. Sold by industrial supply houses everywhere.

CHICAGO Rawhide MFG. CO.
1280 ELSTON AVE · CHICAGO · U·S·A·

Reduce Set Up Time

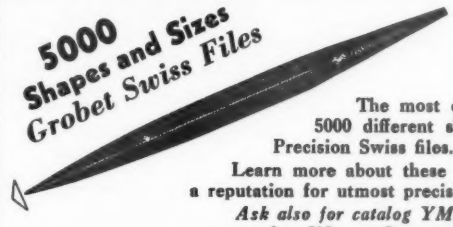


The simple, rigid construction of the Hartford "Super-Spacer", the interchangeable mask plates and the extremely rapid indexing reduce set up time. This feature alone pays for the "Super-Spacer" in a few months of ordinary use.

Write today for particulars.

THE HARTFORD
SPECIAL MACHINERY
HARTFORD, CONNECTICUT

5000 Shapes and Sizes Grobet Swiss Files



Write for Catalog YF

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss files.

Learn more about these Chrome Steel Files that have won a reputation for utmost precision and durability.

Ask also for catalog YM on Files for Filing Machines; catalog YR on Rotary Files and Diesinkers' Burs.

GROBET FILE CORP. of AMERICA • 3 PARK PLACE NEW YORK, N.Y.

When you order or write about products described in TDM PROGRESS please mention the publication.

EXTRA SPEED and POWER in HAND GRINDERS

AIR GRINDERS
50,000 R.P.M.—¼ H.P.

Every shop needs at least one *good* grinder. With an Onsrud MD-1 you are assured of the best. Weighs less than 2 lbs. Handles with greatest ease for heavy grinding or fine touch-up. Impulse reaction type rotor. Full automatic lubrication. Cannot heat up or burn out by stalling in a cut. Write for circular MD-1.

Send For 10-Day FREE TRIAL OFFER

ONSRUD MACHINE WORKS, Inc.
3914 Palmer Street
CHICAGO, ILL.

HANDY RACKS

Now available in 4-Arm, 51" high or the new 5-Arm-Racks, 57" high. Used wherever flat or round bar stock or tubing is kept—factories, warehouses, schools, large & small shops. Four times the usual capacity for the floor or height space. Low cost, & money or space saved.

Send for priced circular.

Wm. S. Yohe Supply Co.
507 Gibbs Ave., N. E.
CANTON, OHIO

METAL and FIBRE
WASHERS & DISCS
SPECIAL SIZES!
No DIE Cost
24 HOURS SERVICE!

H. K. METAL CRAFT MFG. CORP.
387 SECOND AVENUE • NEW YORK, N.Y.

Weldon Tool Company Issues New Catalog

The Weldon Tool Company, Cleveland, Ohio, has issued their new No. 8 Catalog, a complete listing of all stock tools—single end and double-end mills, jig borer end mills, holders, adapters and circular form tools manufactured by this company. Full specifications, including ordering instructions and prices, are given.

The Weldon Tool Company, according to the catalog, was the first end mill manufacturer to increase the spiral angle of the flutes to approximately 30 degrees, a step that made higher speeds and faster feeds practical. This company also made the first straight shank double-end end mill, an innovation that was contemporary with the fast spiral angle. The "Cupped-End" design furnished on most Weldon End Mills insures greater strength and prevents chips from clogging the teeth on the ends. Weldon pioneered this design for Fast Spiral Double-End End Mills.

For a copy of new No. 8 Catalog, write The Weldon Tool Co., 3000 Woodhill Ave., Cleveland, Ohio.

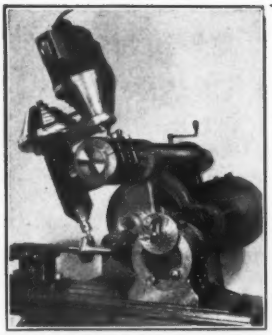
CLOSE GOVERNMENT WORK or other important hardening jobs. Don't take a chance on heat treating. Use Sal-Way Salt Bath for assured accuracy and uniformity.

PENTRATE
Lustrous, black rust-proof finish. Can be applied to any parts made of steel.

SAL-WAY
Steel Treating Inc.
624 W. Elizabeth St.
Detroit - - Michigan

Using electrically heated and controlled Salt-Bath Method exclusively.

When you order or write about products described in TDM PROGRESS please mention the publication.



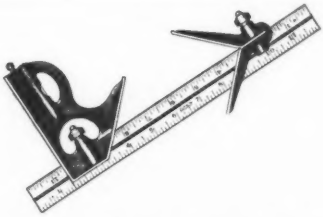
RUSNOK VERTICAL MILLING ATTACHMENT

An all-around duty machine of dependable performance throughout its sound speed range of 375 to 3000 RPM. Rugged spindle design enables effective use of modern end mills to 1½" dia. Fully universal—quick speed changes—easy to set up.

Also obtainable with low-speed motor for milling harder steels on a production basis.

Prompt delivery. Send for illustrated bulletin with specifications.

LOCKWIN & COMPANY
205 WEST WACKER DRIVE
CHICAGO, ILLINOIS

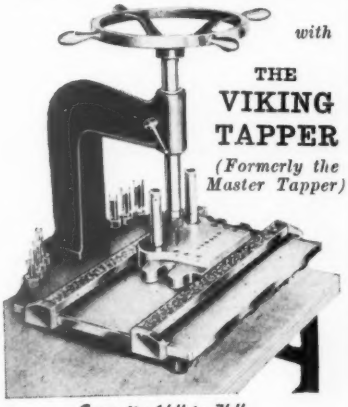


COMBINATION SQUARE

Here's the precision built Lufkin Combination Square. It has many improvements of design and handles most easily. It's built accurately to stay accurate. See it at your dealers. Write for free catalog.

LUFKIN
SAGINAW, MICHIGAN • New York City

Precision Tool Room Tapping
Save Time - Taps - Trouble



with
THE
VIKING TAPPER
(Formerly the Master Tapper)

Capacity ¼" to ⅞"
Send for Circular

The Viking Tool & Machine Corp.
6 Main St. Belleville, N. J.

CAMS — CAMS — CAMS

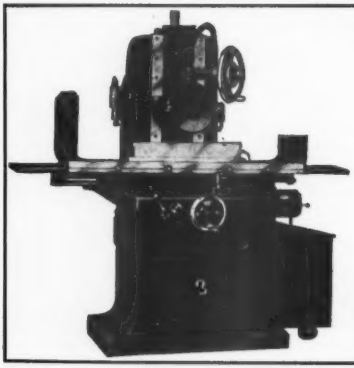
Manufacturers, Machine Builders

Our Patented Process Will Save You
TIME - LABOR - MONEY

We cut your Master Cam direct from the blue print, guarantee accuracy and precision of movement.
You need this service right now in helping to speed up Industry.
Let us solve your cam difficulties — Details on request

ACCURATE CAM SERVICE
Licensed by R. J. Schmidt Co.
Gen. Offices 227 Colonial Arcade Phone MAin 1799 Cleveland, O.

When you order or write about products described in TDM PROGRESS please mention the publication.



GRAND RAPIDS HYDRAULIC FEED

SURFACE GRINDERS

Provide for Tool Room Accuracy at Production Speeds Built in Many Sizes

New Bulletin GL-100 on Request

GALLMEYER & LIVINGSTON

304 Straight Ave., S. W., Grand Rapids, Mich.

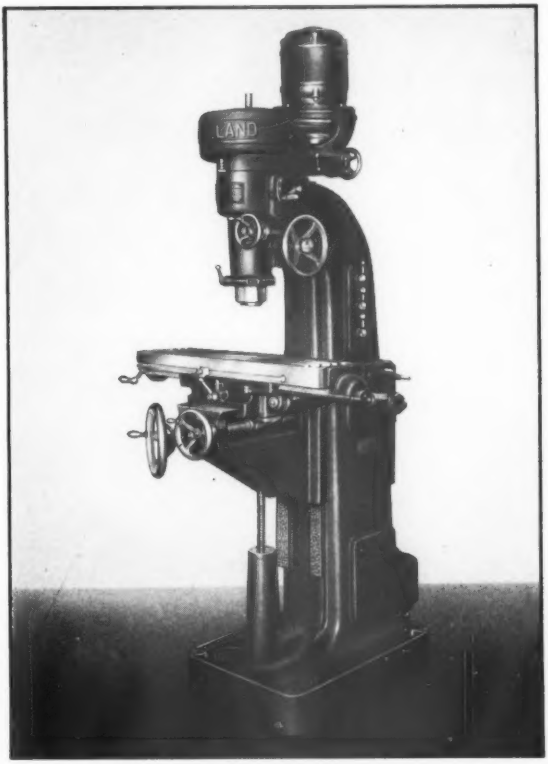
Advertisers Index

Acme Industrial Company 46
Ajax Steel & Forge Co. 45
Armstrong-Blum Mfg. Co. ..... Back Cover
Baker Bros., Inc. .....
Barth Stamping & Machine Works 58
Bates, H. O. 62
Bissett Steel Company 50
Bokum Tool Co., Inc. 47
Boyar-Schultz Corp. 5
Builders Iron Foundry 51
Bunell Machine & Tool Company..52 and 58
Carborundum Co. 7
Cerro de Pasco Copper Corporation 4
Chicago Rawhide Mfg. Co. 63
Cleveland Universal Jig Company 59
Colonial Bushings, Inc. 62
Columbia Tool Steel Co. 60
Continental Machines, Inc. .....16 and 17
Danly Machine Specialties, Inc. 6
Darwin & Milner, Inc. .....
Davis Tool & Engineering Company 58
Dayton-Rogers Mfg. Co. .....
Denning Manufacturing Company 59
Detroit Alloy Steel Co. .....
Detroit Power Screwdriver Co. .....
Detroit Stamping Company 37
Die Supply Co. ..... 43 and 61
Drive-All Manufacturing Co. 8
Dumore Co., The 39
Dykem Co. 60
Enterprise Machine Parts Co....34, 35 and 58
Fameo Machine Co. .....
Federal Products Corp. 57
Federal Tool Corp. .....47 and 58
Foley Manufacturing Co. 55
Ford Motor Co., Johansson Div. .....
Forging and Casting Corporation 3
Gallmeyer & Livingston Co. 66
Gear Specialties, Inc. .....
General Die & Tool Co. 59
George Gorton Machine Co. .....33 and 57
Gerstner and Sons, H. 62
Greenerd Arbor Press Co. .....
Grob Brothers 31
Grobet File Corp. 63
H. K. Metal Craft Mfg. Corp. 64
Hahn Manufacturing Company 59
Hamilton Tool Company .....32 and 59
Hanna Engineering Works .....
Hartford Special Machinery Co. 63
Hovis Screwlock Company 27
Illinois Tool Works .....
Industrial Machine Company 59
Kearney & Trecker Corp. 14
Kiffer Tool & Die Co. 59
Knu-Vise, Inc. 62
K-O Products Co. .....
Koestlin Tool & Die Corp. .....12 and 58
Lincoln Tool & Die Co. 58
Lockwin & Company 65
Lufkin Rule Co. 65
Lyon Iron Works .....
Machinery Mfg. Co. 41
Majestic Tool & Mfg. Co. 58
Master Chrome Service, Inc. .....
McKenna Metals Co. .....
McKinney Tool & Manufacturing Co. 59
Meehanite Research Institute .....
Modern Collet & Machine Co. .....
Modern Tool and Die Company 59
Monarch Machine Tool Co. .....
New Method Steel Stamps, Inc. .....
Northwestern Engineering Company 58
Norton Company 10
Ohio Tool Company 59
Oliver Instrument Co. 44
Onsrud Machine Works, Inc. 64
Paramount Tool Company 59
Phoenix Machine Company .....11 and 59
Pioneer Eng. & Mfg. Co. 61
Geo. H. Porter Steel Treating Co. .....
Precision Spring Corp. 13
Production and Machine Tool Show.....
.....Inside Front Cover
Putnam Tool Co.....Front Cover
Robbins Engineering Co. 58
Ross Operating Valve Co. .....
Royal Oak Tool & Machine Company 58
S & E Folding Machine Co., Inc. 58
Sal-Way Steel Treating, Inc. 64
Geo. Scherr Co., Inc. 61
R. J. Schmidt Co. 65
Schraner, A. P. & Company 59
Siewek Tool Co. .....
Sleeper & Hartley, Inc. .....
Sommer & Adams Co. .....
.....Inside Back Cover and 59
South Bend Lathe Works 9
Star Machine & Tool Company.....49 and 59
Star Tool & Die Works 58
Strong, Carlisle & Hammond Co. 48
Taylor, E. V. 58
Tomkins-Johnson Co. 53
Tools & Gages, Inc. 59
Vacuum System, Inc. 63
Variety Machine & Stamping Company ... 59
Viking Tool & Machine Corp. 65
Walton Company 61
Wheelock, Lovejoy & Co. 49
Wittek Manufacturing Co. 50
Yohe Supply Co., Wm. S. 64

When you order or write about products described in TDM PROGRESS please mention the publication.

Announcing

the New Cleveland No. 1 Vertical Milling Machine



Designed for the exacting precision requirements of the Tool Room, the Die and Mold Shop, and the heavy duty of continuous Production

Capacity:
Longitudinal feed, 18″
Cross feed, 8″
Vertical feed, 16″

Table:
Working surface, 8″ x 32″
T-Slots, Three, 17/32″
Power by 1/3 hp motor

Table Feed:
Twelve feeds with range from 6″ to 12½″ per minute.

Spindle:
Chrome nickel steel, heat treated and ground.

SPECIFICATIONS

Taper No. 30 (new National Standard)
Mounted on Pre-Loaded Precision Ball Bearings.

Spindle Speeds:
Twelve, with range from 100 to 1850 r.p.m. Power from 1½ hp motor, flange mounted and adjustable with hand wheel to shift "V" belt for quick change of spindle speeds.

Feed Screws:
Mounted on Timken bearings; are provided with dials graduated in thousandths of an inch.

Feed Gears:
Chrome nickel steel; mounted on Timken bearings.

Floor Space:
36″ x 42″ front to back x 87″ high.

Cutter Capacity:
1/16″ to 3″ mills.

Over 20 years of experience in machine design and building backs up the performance of the new Cleveland.

THE SOMMER & ADAMS COMPANY

18511 Euclid Avenue — Cleveland, Ohio

Representatives

JOHN E. LIVINGSTONE & CO.
2921 E. Grand Blvd., Detroit and Windsor, Ont.

NEFF-KOHLBUSH & BISSELL
2257 W. Madison Street Chicago

E. H. JONES (Machine Tools) Ltd.
Edgware Road, Hyde London, England

MARVEL

Saws

MARVEL No. 8 . . it does all things well

The busiest tool in the tool rooms, an essential tool in the complete die shop and a time and money saver in the maintenance department, because "it does all things well". The MARVEL No. 8 Metal Cutting Band Saw (capacity 18"x18") is the most universal saw built. It will snip off a ⅛" drill rod, rough out the largest billet or cut a perfect 45° mitre on the end of a large I-beam without any special setting-up. Its continuous blade feeds into the work at any angle from 45° right to 45° left. It has a large, removable vise and a combination hand and power feed.

Write for Bulletin 800A

Holding Fixtures
Mitering
Roughing Out
Double Angles
Squaring Rounds
Matched angles without waste
Indexing
Mitering-Coping
Odd Pieces
Die Shanks
Splitting Rings

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5757 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales Offices: 199 Lafayette St., N. Y.